

The Linguistic Construction of Epistemological Difference

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Abstract

How are beliefs about the nature of knowledge reflected and reproduced in language use? It is clear that some linguistic resources, e.g. the modal verbs *may* and *must*, indicate one's *epistemic stance* with respect to a proposition, i.e. one's judgement of how likely it is to be true. What is less clear is how the use of such resources relates to speakers' beliefs about the nature of knowledge *per se*, i.e. their *epistemic policies* (Teller 2004). To investigate the putative relationship between epistemological variation and linguistic variation, I examine samples of written and spoken English from a community that is particularly epistemologically diverse: academia.

I synthesize research on social epistemology, sociolinguistics, linguistic anthropology, and Academic English (AE) to propose an explanatory model of variability in the expression of epistemic stance. Then, using AE as a case study, I evaluate the predictions of this model both quantitatively via corpus analysis of research articles and regression modelling of interview data, as well as qualitatively via analysis of discursive practices in terms of experience-organizing *frames* (Goffman 1974) and the semiotic notion of *indexicality* (e.g. Irvine 2001), whereby ideological differences produce, and are reproduced by, linguistic differences.

This research makes contributions to a number of fields. It questions the analytic validity of disciplinarity, providing support for a unifying theory of variation in AE based instead on an epistemologically principled analysis of institutional language use. The indexical basis of sociolinguistic research on language and belief/identity is problematized by attending to epistemological context; the ramifications of this will be explored in future research. I develop a linguistic metric of epistemic belief, offering a means of developing a quantitative social epistemology to complement that field's highly articulated theoretical work. Applications beyond academia are possible in areas concerned with knowledge management and transfer, such as public health.

Declaration

I, John Weston, confirm that the research included within this thesis is my own work or that where it has been carried out in collaboration with, or supported by others, that this is duly acknowledged below and my contribution indicated. Previously published material is also acknowledged below.

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Table of Contents

Abstract.....	2
Declaration.....	3
List of Figures.....	7
List of Tables.....	8
Acknowledgements.....	10
 Chapter 0. Outline of Thesis.....	 11
 Chapter 1. Epistemological Difference.....	 21
1.1 Classical epistemology.....	23
1.2 Knowledge in a social world.....	36
1.2.1 Epistemic policy.....	39
1.2.2 Epistemic policy range: The case of academia	43
1.3 Epistemology and language: Methodological considerations.....	57
1.3.1 Epistemic policy and epistemic Stance (cf. frame and footing).....	58
1.3.2 Possible linguistic correlates of epistemic policy	59
1.3.3 Measuring epistemic policy: Insights from experimental philosophy	62
1.4 Summary	64
 Chapter 2. The Language of Epistemological Difference	 66
2.1 Style and belief	68
2.1.1 Classical variationist research on style	70
2.1.2 Linguistic anthropological research on style.....	77
2.2 Indexicality, style and stance	85
2.2.1 Style and stance.....	89
2.2.2 Epistemic stance.....	91
2.2.3 Indexicality	97
2.3 The case of Academic English.....	102
2.3.1 Genre, register and style.....	103
2.3.2 Linguistic variables in the construction of disciplinary difference	106
2.3.3 Linguistic variation across disciplines	115
2.4 Summary	121
 Chapter 3. Corpus study: Methods and Results.....	 123
3.1 Corpus structure	127
3.2 Variables	140

3.2.1	Epistemic policy.....	141
3.2.2	Other external variables	142
3.2.3	Dependent variables.....	145
3.3	Results.....	155
3.3.1	Evidential verbs.....	156
3.3.2	Verbal modality.....	161
3.3.3	Adverbial modality	165
3.4	Summary	168
Chapter 4.	Interview Methods and Results (Internal Factors).....	171
4.1	Interview participants.....	172
4.2	Modified sociolinguistic interview	177
4.3	Variables: Operationalization and coding.....	184
4.3.1	A metric of epistemic stance.....	186
4.3.2	Main verb type	194
4.3.3	Main verb aspectual class	197
4.3.4	Tense.....	199
4.3.5	Subject type.....	201
4.3.6	Talk type	203
4.3.7	Voice.....	205
4.3.8	Polarity.....	207
4.4	Results.....	208
4.4.1	Main verb type: Mental verbs only	214
4.4.2	Main verb type: Mental versus non-mental Verbs.....	219
4.4.3	Main verb aspectual class	220
4.4.4	Tense.....	221
4.4.5	Subject type.....	223
4.4.6	Talk type, voice and polarity.....	223
4.5	Discussion	224
Chapter 5.	Interview Methods and Results (External Factors).....	227
5.1	External variables: Operationalization and coding	229
5.1.1	EPR	229
5.1.2	Academic division.....	241
5.1.3	Topic	246
5.1.4	Academic age.....	254
5.1.5	Sex.....	257
5.1.6	Other external variables	259

5.2	Results.....	261
5.2.1	EPR	262
5.2.2	Academic division.....	265
5.2.3	Topic	276
5.2.4	Academic age.....	277
5.2.5	Sex.....	277
5.2.6	Other external variables	282
5.3	Discussion.....	284
5.3.1	An example of EPR/ESI shift by topic	288
Chapter 6.	Conclusion	295
6.1	Main empirical findings.....	296
6.2	Implications for linguistics.....	301
6.3	Other implications.....	306
6.4	Conclusion: Power and knowledge, facts and values, is's and oughts	309
Appendix: List of articles used in the corpus analysis in Chapter 3		313
Bibliography		325

List of Figures

Figure 1.1 Some possible analyses of know/ledge	33
Figure 1.2 Kolb-Biglan typology of academic disciplines.....	47
Figure 3.1 Frequency of evidential verbs in the TCC.....	158
Figure 3.2 Frequency of evidential verbs in the PsyC	159
Figure 3.3 Frequency of evidential verbs in SLC	159
Figure 3.4 Frequency of modal verbs in the TCC.....	162
Figure 3.5 Frequency of modal verbs in the PsyC.....	163
Figure 3.6 Frequency of modal verbs in SLC.....	164
Figure 3.7 Frequency of modal adverbs in the TCC.....	166
Figure 3.8 Frequency of modal adverbs in the PsyC	167
Figure 3.9 Frequency of modal adverbs in SLC	167
Figure 4.1 A typology of academia.....	182
Figure 4.2 Frequency distribution of EI scores in NAP corpus	210
Figure 4.3 Q-Q plot of ESI values in NAP corpus.....	210
Figure 4.4 Mean ESI of 9 classes of verb	214
Figure 4.5 Effect of main verb type and aspectual class on mean ESI score.....	220
Figure 4.6 Effect of main verb type and tense on mean ESI score	222
Figure 5.1 The relationship between disciplinarity and EPR.....	244
Figure 5.2 The epistemic dimensions of topic	247
Figure 5.3 Graph of aggregate mean ESI versus EPR	264
Figure 5.4 Graph of interaction between academic division, topic and age	267
Figure 5.5 Graph of aggregate mean EI versus disciplinary affiliation	269
Figure 5.6 Graph of aggregate mean ESI versus “culture”.....	270
Figure 5.7 Graph of aggregate mean ESI versus topic.....	277
Figure 5.8 Graph of aggregate mean ESI versus sex	278
Figure 5.9 Graph of interaction between topic and sex	279
Figure 5.10 Graph of interaction of academic division, topic and sex	281
Figure 5.11 Graph of the effect of topic and L1 on ESI	282
Figure 5.12 Graphs of interaction between topic and L1	283

List of Tables

Table 0.1 Research Questions	20
Table 1.1 Knowledge in academic disciplines	48
Table 1.2 Possible linguistic correlates of epistemic policy elements	60
Table 2.1 Common lexico-grammatical features used for stance analyses.....	107
Table 3.1 Stable epistemic policy bundle element variants in Arts and Science	125
Table 3.2 Structure of the Two Cultures corpus (TCC).....	129
Table 3.3 Structure of the psychology corpus (PsyC).....	132
Table 3.4 Structure of the sociolinguistics corpus (SLC)	137
Table 3.5 Summary of the epistemological character of journals.....	140
Table 3.6 Coding distinctions for modal verbs	151
Table 3.7 Coding distinctions for modal adverbs	152
Table 3.8 Coding distinctions for evidential verbs	153
Table 3.9 Prediction summary	153
Table 3.10 Number and frequency (%) of evidential verbs	157
Table 3.11 Number and frequency (%) of modal verbs	161
Table 3.12 Number and frequency (%) of modal adverbs	165
Table 3.13 Variable summary	169
Table 3.14 Prediction summary	169
Table 4.1 Interview participants.....	173
Table 4.2 Interview participants' vital statistics	176
Table 4.3 Internal variables.....	185
Table 4.4 Verbal modality coding conventions	188
Table 4.5 Adverbial and adjectival modality coding conventions	188
Table 4.6 Relativity coding conventions.....	189
Table 4.7 Domain coding conventions	190
Table 4.8 Degree coding conventions.....	191
Table 4.9 Comparator coding conventions	191
Table 4.10 Main verb types in interview data.....	194
Table 4.11 Predicted effects of main verb type on ESI.....	196
Table 4.12 Predicted effects of main verb aspectual class on ESI.....	198
Table 4.13 Numbers of verbs	199
Table 4.14 Predicted effects of tense variants on ESI.....	200
Table 4.15 Predicted effects of subject variants on ESI.....	203
Table 4.16 Predicted effects of talk type variants on ESI.....	204
Table 4.17 Distribution of verb types by talk type.....	205
Table 4.18 Predicted effects of voice variants on ESI	206
Table 4.19 Predicted effects of polarity variants on ESI	208
Table 4.20 Distribution by levels of internal variables in full corpus.....	209
Table 4.21 Analysis of variance table of type 3 with Satterthwaite approximation for degrees of freedom for final linear mixed model of NAP corpus.....	212
Table 4.22 Regression summary table of final linear mixed model of NAP corpus.....	213
Table 4.23 Analysis of variance table of type 3 with Satterthwaite approximation for degrees of freedom for final linear mixed model of NAP corpus (mental verbs only)...	215
Table 4.24 Regression summary table of final linear mixed model of NAP corpus (mental verbs only)	216
Table 4.25 ESI component contributions for main verb type	217
Table 4.26 ESI component contributions for tense.....	219
Table 4.27 Number and relative frequency (%) of past and nonpast tensed verbs	222
Table 4.28 Mean ESI score by subject type.....	223
Table 5.1 Summary of ESI components	227

Table 5.2 External variables	229
Table 5.3 Participants' responses to two Gettier problems.....	234
Table 5.4 Interview participants' vital statistics	243
Table 5.5 Percentage of female academic staff in UK universities	259
Table 5.6 Distribution of external variables by levels	261
Table 5.7 Analysis of variance table of type 3 with Satterthwaite approximation for degrees of freedom for final linear mixed model containing EPR (main corpus)	262
Table 5.8 Regression summary table of final linear mixed model containing EPR (main corpus)	263
Table 5.9 Analysis of variance table of type 3 with Satterthwaite approximation for degrees of freedom for final linear mixed model containing academic division (main corpus)	266
Table 5.10 Regression summary table of final linear mixed model containing academic division (main corpus)	268
Table 5.11 ESI component contributions for EPR.....	271
Table 5.12 ESI component contributions for division	273

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Chapter 0. Outline of Thesis

In this thesis I examine the relationship between epistemological variation and linguistic variation. This relationship has not been investigated before, although several research traditions have developed relevant empirical and theoretical groundwork for it. I spend the first two chapters laying out this groundwork and explaining how it refines my general research question into several smaller ones to be addressed in subsequent chapters. My general research question is: How are beliefs about the nature of knowledge reflected and reproduced in language use? Previous research on this area has largely ignored epistemological considerations, either focusing on a restricted set of linguistic forms isolated from their communicative context (e.g. research on evidentiality and modal semantics), or producing a wealth of observational data but lacking a theoretical framework with which to interpret its empirical findings (e.g. research on Academic English). To attempt to answer this research question in an epistemologically principled and sociolinguistically realistic way, I synthesize research on social epistemology, sociolinguistics, linguistic anthropology, and Academic English (AE).

In Chapter 1, I introduce the reader to the field of epistemology, and I explore how individuals' epistemological commitments—i.e. their beliefs about the nature of knowledge—can be formulated as a social variable in a similar way to sociodemographic categories such as class and gender, which are more familiar to sociolinguists. Indeed, much of the first chapter on epistemology is intended as a general introduction for sociolinguists who are not familiar with the basic concepts in epistemology relied upon later in the thesis. By considering the nature of knowledge itself, and then looking at how beliefs about it relate to each other, I

propose a typology of variability in epistemological commitments (or *epistemic policies*). I argue that the consequent proliferation of epistemic policy bundles can be arranged on a continuum of *epistemic policy range* (EPR) from relatively narrow to relatively wide. I focus in this thesis on the language of academia, i.e. the communicative practices of a population that is particularly epistemologically diverse. I make the ethnographic claim that, while narrow and wide EPRs are adopted by individuals in all academic disciplines, there is a tendency for the sciences to favour narrow EPRs, and for the arts to favour wide EPRs. So, by looking at the fundamentals of epistemology, I orient the reader to this area of inquiry and then develop a typology of epistemic policies. Then, I apply the notion of epistemic policy range to my test population. Chapter 1 concludes by suggesting some possible linguistic correlates of variable epistemic policy.

In Chapter 2 I review the sociolinguistic and linguistic anthropological research on stylistic variation. This provides the conceptual tools to understand how language *style*—ways of speaking—can vary in relation to variable epistemic policy. I review the notion of *indexicality*, whereby a social variable may become linked—via the taking of *stance*—to a linguistic variable via the processes of *iconization*, *recursivity* and *erasure* (see Chapter 2). I argue that epistemic policy and disciplinarity, as social constructs, both have the potential to become linked to particular patterns of linguistic behaviour. If this is the case, I argue, then any academic in whatever discipline could choose to “sound more scientific” or to “sound more artsy” merely by deploying the appropriate linguistic forms that index those disciplinary areas. Two empirical questions then arise from this: first, are there indeed forms of language that can sound more like arts or sciences?

Secondly, are disciplines (or groups of them) being indexed by linguistic forms, or is it rather the underlying epistemic policies that disciplines rely to which linguistic forms are becoming indexically linked?

I devote a similar amount of time to this area for the benefit of readers from social epistemology backgrounds as I do on epistemology for the benefit of sociolinguists: this is an inter-disciplinary thesis that brings together these two fields in a way that has not been attempted before. I show that existing explanations of stylistic variation in terms of formality, prestige, cultural capital, audience design, and so on, all presuppose that speakers have beliefs about their own identity, beliefs about the structure of society, and beliefs about the social effect of linguistic variables. These beliefs are the basis on which speakers judge one form of language to be more ‘appropriate’ than another in some particular situation. I argue that this central role of beliefs compels sociolinguists to take an epistemologically principled approach to style research.

The situation type I focus on in this thesis is the communication of knowledge down what Heritage (2010) calls an ‘epistemic gradient’, i.e. from someone who knows something to someone who does not know it. In communicating knowledge, speakers take a *stance* towards what they say, presenting their claims as certain or doubtful, good or bad. This stance gets expressed linguistically, for example by embedding the knowledge claim under a complementizer phrase such as *It must be the case that...* or *I’m sorry to say that...* In the rest of the thesis, I explore the relationship between variation in epistemological commitments and the variable linguistic expression of stance. I

carry out this investigation in the context of a test population where epistemology seems to be particularly pertinent: academia.

I discuss how the notions of community of practice and discourse community may be applied to academia. Both communities are defined by shared beliefs and shared communicative practices. I make the case that the beliefs and practices that unify these communities are epistemic policies. Within a community of practice, such as a weekly reading group, these epistemic policies are produced and reproduced in talk during mutual engagement towards a shared goal. Within a discourse community, a relatively wide or narrow range of epistemic policies is permitted (narrow and wide EPR), and these are maintained through textual communication such as journal articles, textbooks and emails. Thus, I describe academia as a nested set of communities that may be described at various levels of organization with reference to EPR. The level of description at which this thesis is aimed is that of the discourse community; the relevance of the community of practice is to highlight an important avenue for future research.

Finally, I review the empirical findings from research on AE, which I suggest has to date suffered from a lack of theorization. I argue that the theoretical framework that I provide here, then, is able to explain those findings, and to raise further questions about the relationship between language and epistemology both within academia and beyond.

These two chapters, one reviewing epistemology and disciplinarity, and one reviewing language variation, community structure and AE, allow me to refine the general research question into the more specific questions listed below. Based on the arguments in Chapter 1, I initially operationalize epistemic policy

variation as disciplinary affiliation in Chapter 3. Based on the review of linguistic literature in Chapter 2, I identify several linguistic variables used in the construction of stance, for example modal verbs and adverbs (e.g. *must/may* and *certainly/possibly*), and evidential verbs (e.g. *demonstrate/suggest*). It is a relatively novel approach to treat these linguistic items as sociolinguistic variables, but I argue (following Pichler 2010 among others) that it is warranted since stance is a discourse-level variable phenomenon (see below).

- Are there general patterns of linguistic variation across academic disciplines?
 - Are there “typical arts” and “typical science” linguistic styles?
 - Do academics in disciplines that span arts and science (e.g. psychology and sociolinguistics) differentiate themselves linguistically in similar ways (using these putative typical styles)?
- Is there evidence for linguistic variation that tracks epistemic policy?
 - Is epistemic policy a better explanatory factor for linguistic variation in AE than disciplinarity?
- Is there empirical support for a connection between epistemological variation and linguistic variation via indexical processes (e.g. recursivity)?
- Is the epistemological differentiation in discourse communities (re)produced similarly in talk and text?

Before describing how these questions will be answered in the empirical chapters (3 to 5), I will explain the nature of the linguistic variable under investigation in this thesis, which is an innovative extension of the discourse-level variable. As

discussed in Chapter 2 (see Section 2.3.2), the prototype of a sociolinguistic variable is at the level of phonology, for example variable (t) in words like *bottle*. Variable (t) has several variant forms in English, such as the Standard English aspirated stop [t^h], the Standard American English flap [ɾ] or the non-standard English glottal stop [ʔ]. The assumption that variants are different ways of saying the same thing becomes more difficult to justify as one moves to structurally more complex linguistic levels such as morphosyntax (e.g. *was/were* alternation), or to discourse-level linguistic phenomena (e.g. the general extenders *and whatever/and stuff*).

In the present work I identify a discourse-level variable: the linguistic expression of *epistemic stance*. In Examples (1a–c), the same propositional content *that there is a pussycat*, is embedded within additional linguistic material that does not change that proposition, but which communicates my epistemic stance towards it, i.e. whether and why I believe it.

- (1) a. There is a pussycat.
- b. I saw a pussycat.
- c. I thought I saw a pussycat.

Example (1a) may be called a “bald statement”, i.e. it merely expresses the propositional content. Example (1b) adds information about the sensory channel by which this information was acquired, and Example (1c) renders this information less certain than in Examples (1a) and (1b). These examples illustrate different epistemic stances towards the same proposition. To look at stance as a linguistic variable, it is necessary not only to identify what forms it can take, but also where it can occur, i.e. the *envelope of variation*. I identify the envelope of

variation for the expression of epistemic stances with the *clause*, i.e. the smallest linguistic expression of a proposition, as in Example (1a). Example (1b) is a grammatically larger clause containing the proposition in Example (1a). All the linguistic material that contributes to the expression of an epistemic stance towards a proposition is treated as a single variable (see also Section 4.3.1)

My empirical starting point (in Chapter 3) is a cross-disciplinary comparison of modal and evidential language in three corpora of at least 40 research articles each (totalling 1.1 million words).¹ A “Two Cultures” corpus was composed to represent the received opposition between “Science” and “The Arts” (after C. P. Snow 1959): it contains articles from *Science* and *Nature*, as well as the *New Left Review* and *Tamara Journal for Critical Organization Inquiry*. Two further corpora were based on epistemologically diverse disciplines of sociolinguistics and psychology; each included journal articles of both a more scientific and more critical theoretic bent. An analysis of these corpora provides empirical evidence of linguistic variation between epistemologically diverse groups.

Following Dines’ advice², I conduct a frequency-based analysis on three different elements that can contribute to an epistemic stance: modal verbs, modal adverbs and evidential verbs. These forms relate most directly to the definition of knowledge by conveying the degree of commitment to a proposition (modality) and the method by which that degree of commitment was decided (evidentiality). Modal semantics and evidential morphology have both been studied from formal

¹ Details of the methods used are given in the initial parts of the empirical Chapters 3, 4 and 5.

² ‘If some variants are initially inaccessible because they are not transparently related either syntactically or semantically, then analysis will necessarily begin at the level of differential distribution; the higher frequency of *one* form in *one* social group.’ (Dines 1980: 21).

and typological perspectives, but they have not been considered as variables that might track epistemic policy before. I do not claim to identify an exhaustive list of modals and evidentials, but rather I identify a small set of them with which to get a first look at variability in epistemic language across in text.

Next, I include additional epistemic language elements to look at variability in epistemic stance language in talk in Chapters 4 and 5. The analysis in these chapters is based on transcribed sociolinguistic interviews with 34 academics, again in an epistemologically diverse range of disciplines, but in subjects that only partially overlap with Chapter 3. This enables a broader coverage of disciplines, and it also means that patterns that generalize across many discipline types may be identified. In these chapters I identify six different types of epistemic stance element, including modal verbs and adverbs, and I combine them into a single numerical score (called the *epistemic stance index*, ESI) indicating the strength and polarity of the epistemic stance of each clause. Positive ESI scores indicate relative certainty, as indicated by elements such as *must*, *certainly*, *always*, and negative ESI scores indicate relative doubt, as indicated by items like *may*, *possibly*, *sometimes*. The variable elements in each ESI score are defined exhaustively with respect to the interview data, and the combined score (the sum of all the positive and negative scores of the epistemic elements in each clause) is then made the dependent variable of mixed models looking separately at linguistic and social predictors (after Labov 2001a; see discussion at start of Chapter 4). Since the ESI is a composite score based on the behaviour of several different parts of speech acting in concert, the linguistic factors affecting ESI scores contribute a large amount of noise regression models.

On the other hand, in Chapter 5 I demonstrate that social factors, notably EPR, affect ESI scores in a more harmonious manner. This is a compelling reason to keep the internal and external factors separate in regression modelling of complex linguistic variables such as the ESI. Through comparison of the effects of disciplinary affiliation and epistemic policy on the stance score, I show that disciplinarity is indeed of less analytic utility than has been previously assumed in the AE literature.

In addition to operationalizing epistemic policy as disciplinary affiliation, interview participants were also classified into two types according to their epistemic policy range (as discussed in this chapter below): narrow (having a restricted range of methodologies constrained by a monolithic theory of knowledge); and wide (using a diversified range of methodologies informed by multiple non-contiguous epistemologies). These categories partially overlap respectively with Science and Arts, but they are based on the general nature of knowledge-making practices rather than on historically contingent institutional divisions. Interviews covered a range of topics including personal biography, “impact”, and research. The topics were chosen to elicit diverse epistemic stances, e.g. recounting first-hand experience versus disciplinary consensus knowledge. This meant that it was also possible to look at variable stance construction within a single speaker, within a single discipline, and also between groups of speakers. I show that epistemic policy range is more useful than disciplinary affiliation as a predictor of epistemic language use. In short, I develop a novel, epistemologically principled measure of epistemic beliefs which is not only more valid than disciplinary affiliation, but it also has greater predictive power in terms of

linguistic variation. Some consequences of this for social epistemology, sociolinguistics, and AE are discussed in Chapter 6.

Table 0.1 shows how the research questions identified above relate to the methods used in Chapters 3, 4 and 5.

Table 0.1 Research Questions

Research Question	Addressed how and where
Are there general patterns of linguistic variation across academic disciplines?	Corpus analysis of research articles. Frequency analysis of modal verbs, modal adverbs and epistemic verbs. See Chapter 3.
Are the Science and Arts poles of linguistics and psychology similar?	
Is there empirical support for a connection between epistemological variation and linguistic variation via indexical processes (e.g. recursivity)?	
Is there evidence for linguistic variation that tracks epistemic policy?	Mixed modelling of factors affecting epistemic stance scores in interviews. See Chapters 4 and 5.
Is epistemic policy a better explanatory factor for linguistic variation in AE than disciplinarity?	
Is the epistemological differentiation in discourse communities (re)produced similarly in talk and text?	Comparison of Chapters 3, 4 and 5. See Chapter 6.

To summarize, Chapters 1 and 2 present the epistemological and sociolinguistic background to the rest of the thesis. Chapter 3 looks at variation in epistemic stance language in text in an exploratory, frequency-based manner, while Chapters 4 and 5 expand the number of variants considered, and combine these into a numerical score in order to present a more complete picture of epistemic stance variation in AE. Chapter 6 summarizes the main findings and discusses their wider significance.

Chapter 1. Epistemological Difference

The underlying epistemology, history, and theory of a field cannot be separated from its rhetoric. The rhetorical action is mounted within a conceived world and in pursuit of ultimate as well as immediate goals. The more you understand the fundamental assumptions and aims of the community, the better able you will be able to evaluate whether the rhetorical habits you and your colleagues bring to the task are appropriate and effective. Much of the rhetorical change we have observed in various periods has been driven by the gradual realization of the rhetorical consequences of epistemological commitments and communal goals. [...]

More locally, it is useful to understand how your individual assumptions and goals fit in with the epistemology and goals of the community you are participating in and contributing to. If your work is simply harmonious with disciplinary assumptions and projects, and if the discipline has forged a rhetoric adequate to its beliefs and tasks, you can adopt the local rhetoric with a fuller understanding and commitment. If, however, you find yourself in some way at odds, you can begin to understand the rhetorical task before you—both in developing terms appropriate to your emerging claims and in finding ways to make your claims intelligible and persuasive to peers committed to other beliefs and rhetorics.

(Bazerman 1988: 323–34)

Charles Bazerman's advice for writers and teachers of technical English composition foreshadows several of the ideas and arguments explored in this thesis. The central aim of the present work is to explore the relationship between epistemology and language. Bazerman uses the terms 'epistemology' and 'epistemological commitments' to refer to beliefs about the nature of knowledge, including answers to questions like: What is knowledge? How do we acquire it? Can we acquire it? In this sense, epistemology is the foundation on which all belief systems are built: it dictates how—and whether—we come to believe anything at all. This introductory chapter is concerned with understanding what epistemological commitments are, how it is that they can vary from person to person, and how to operationalize that variation.

Bazerman says that epistemology ‘cannot be separated from its rhetoric’ (1988: 323). In other words, our beliefs about the nature of knowledge are formulated, shared, and performed linguistically. Bazerman says that rhetoric must be ‘appropriate and effective’ in view of ‘the epistemology and goals of the community you are participating in’; and he holds that language must be ‘harmonious’ with the epistemological commitments of one’s audience (1988: 323–324). Bazerman assumes that epistemology is variable, and that language use is variable, and that if you want to ‘make your claims intelligible and persuasive’, then you need to express your claims in a form that appears to match the epistemology of your audience (1988: 324). So, Bazerman suggests a linkage between epistemological commitment and linguistic form, but he also suggests that claims can be linguistically reformulated so as to evoke different epistemological commitments. In other words, there is a “loose fit” between epistemology and language: one does not fully determine the other. This underdetermination of meaning by form is key to recent approaches to sociolinguistic variation.

Several distinct research traditions have laid the groundwork for understanding the relationship between language and epistemology, or rather that aspect of it that concerns the present thesis: the relationship between linguistic variation and epistemological variation. Since this relationship is an essentially inter-disciplinary research object, I draw on multiple research paradigms in order to characterize it and investigate its behaviour.

In the rest of this chapter I explore the “social turn” in epistemology which has made a *variationist* treatment of epistemology conceivable. I develop the

notion of the *epistemic policy*, i.e. belief-forming practices. These are the component elements of Bazerman's 'underlying epistemology'. In other words, epistemic policies are fundamental conceptual units that comprise one's beliefs about, and attitudes towards, knowledge. I then show how this typology applies in the case of academia.

I now turn to the basic concepts of epistemology: what is knowledge and how do we acquire it? I review the classical analysis of knowledge in Section 1.1, and I show how this has been developed in social epistemology in Section 1.2. The social epistemological notion of *epistemic policy* is introduced in Section 1.2.1, and placed in the context of social psychological and language socialization research. In Section 1.2.2, I develop a typology of epistemic policy, and I show how this can be used in the case of academia in Section 1.2.3. I review work in experimental philosophy which has looked at epistemological variation in Section 1.3.

1.1 Classical epistemology

Classical epistemology is a branch of philosophy concerned with characterizing the nature of knowledge. Its research questions are often pithily expressed as "What is knowledge?" and "Do we have any of it?" (see e.g. Campbell *et al.* 2010: 1). The traditional use of the word epistemology is simply to name a sub-specialism of philosophy; classically, epistemology is not the kind of thing a person can "have" (Paul Elbourne, p.c.). Classical epistemology seeks to analyse knowledge *per se*, and it is not concerned with what individuals happen to believe

about the nature of knowledge. However, epistemology is not a completed science: no conclusive and indefeasible analysis of knowledge has yet been found. Debate continues among epistemologists as to what the most useful analysis is, so clearly professional philosophers differ in their beliefs about the nature of knowledge. In this section, I review the most fundamental areas of dispute among epistemologists, and I argue that these are also areas of dispute—and hence variability—for laypeople (Section 1.2).

Epistemological questions are as old as thought itself, but the analysis of knowledge is usually dated back to Plato (Ichikawa and Steup 2014; Campbell *et al.* 2010). Plato is credited with proposing that the necessary and sufficient conditions for knowledge are that it be justified, true belief (see e.g. Fine 2003: 1–6). In other words, to know something, you have to believe it, that belief has to be true, and that belief has to be justified somehow. Plato argued that these conditions were individually necessary and jointly sufficient for something to count as knowledge. I will symbolize the justified-true-belief analysis of knowledge as JTB.

Each of these conditions is problematic, and has its own research literature. Furthermore, it has also been proposed that these conditions are not jointly sufficient for the attribution of knowledge in some situations (see e.g. Gettier 1963), and not individually necessary in others (e.g. Radford 1966). Nevertheless, the JTB analysis of knowledge is a useful starting point in order to understand one of the central ideas in this thesis—epistemological variation—since it is precisely the disputed character of the analysis of knowledge that makes a variationist approach to epistemology possible. I now look at each element of

JTB individually, starting with B for belief, then T for true, and finally J for justified.

The belief criterion is the most (naively) perspicuous element of JTB in that it requires that knowledge be held by a knower, i.e. that a person “apprehends” and “commits to” the proposition³ in question. It is not enough for something to merely be justified and true (take these terms at face value for the moment). For example, if you enter the following calculation into a calculator:

$$\log_{57} 9 \times \sqrt[8]{60\,066}$$

and look away while the answer appears, then what appears on the screen is justified and true (to the extent that the calculator is infallible), but to say that the calculator *knows* the answer is to speak metaphorically, personifying the calculator. After all, which aspect of personhood is being attributed to it? It seems to be the ability to apprehend and commit to the answer, neither of which is literally appropriate. Already at this point it is possible to envision objections. What if there is some other property apart from apprehension that qualifies an inanimate object as a knower? What if the calculator were so advanced that it was deemed to be “sentient”? How is the human mind/brain different from a computer? These objections, while fascinating, constitute several overlapping but distinct research programmes (e.g. artificial intelligence, philosophy of mind, cognitive science) and are therefore beyond the scope of this thesis (for an overview see Cole 2014). Furthermore, exploring these objections further would take our discussion very far away from what non-philosophers think about when

³ For the present argument, a *proposition* is “a thing that can be true or false”; it can be used to complete a sentence like this: *I believe that*_____.

they think about knowledge, which is the kind of epistemological issue that concerns this thesis.

Another metaphor that gets applied to knowledge is that it is a substance that can be contained, for example, in a book. However, it would be incongruous to claim that the book *knows* anything. Similarly, if the calculator printed out the answer rather than revealing it on its screen, we would not be any more inclined to say that the calculator (or the print-out) *knows* anything. This suggests that *knowledge* and *knowing* might have different conditions. Perhaps *knowing* should be analysed as believing a justified truth B(JT). This would make *knowledge* “merely” justified truth (JT). Note that this analysis is formed on the basis of how one talks about knowledge in Standard English, which is a popular approach in (Anglo-American) analytic philosophy (see e.g. Austin 1962; based on Wittgenstein’s 1922 “ordinary language” approach). The popularity of the approach is no guarantee of its efficacy however, and it is far from clear that analysing “how to do things with words” enables analytic philosophers to “carve nature at its joints”.

I am primarily concerned in this thesis with *propositional knowledge*, i.e. knowledge *that* rather than knowledge *how*. It is an accident of the English language that these two distinct types of knowledge are referred to with the same word, cf. other Germanic, Romance, Finnic languages etc. Knowledge that *x* can be called propositional knowledge since the *x* is a proposition. This contrasts with knowledge how to drive, and also knowledge of, e.g. a person as in *I know Mary*. Unless otherwise stated, when I use the word *know* or *knowledge*, I am referring to the propositional kind. *Belief* that *x*, then, seems to be required in order to *know*

that x , but it may not be required in order for x to count as *knowledge*. In other words, the act of knowing seems to require that $K = B(JT)$, i.e. it requires believing some piece of knowledge (JT). These may be viewed as facts about (the Standard English) language, or about knowledge, or both. I argue in this thesis that knowledge and epistemological commitments are not merely reflected in language, but they are produced by our use of language. Given this *linguistic constructionist* approach, the variable communicative use of words like *know* or *knowledge* is of greater importance than are *a priori* intuitions about their semantics in Standard English or about the analysis of knowledge. In short, I argue that an analysis of empirical data concerning the socially-situated use of evidential language on the one hand, and the variability in beliefs about knowledge on the other, will ultimately be more informative about the relationship between epistemology and language than a classical analysis of knowledge in the tradition of analytic philosophy. I return to the belief criterion in Section 1.2.2 below.

The truth criterion⁴ may be naively assumed to require that, in order to count as knowledge, a proposition needs to “match” or “correspond” to a state of affairs in the world. This is called *realism* about truth, because it assumes that the truth of a proposition depends on the existence of a reality beyond one’s own mind. In contrast, *non-realism* about truth does not require a correspondence to an extra-mental reality. For a realist, then, the sentence *snow is white* is true if, and only if, there is a substance called *snow* which is actually out there in the world (not merely imagined) and it has the property of being white in colour. For a non-

⁴ I.e. the “T” of JTB “justified true belief” or B(JT) “belief in (a justified truth)”.

realist, snow does not have to actually exist or actually be white for the sentence *snow is white* to be true! All that is required is that the proposition that snow is white is not contradicted by any other true propositions (e.g. snow is yellow). (For a detailed review of realist and non-realist approaches to truth, see e.g. Kirkham 1995).

Non-realism seems very counterintuitive to the layperson. One situation where it seems less counterintuitive is in the case of time-limited or geographically local knowledge. Physicists living before the advent of Einstein's theory of relativity *knew* that Newton's laws of motion applied to all material objects in the universe.⁵ After Einstein, they had to revise that *knowledge*, so it seems like they never really *knew* it in the first place. However, this implies that we can only *know* things that can never be disproved: our best explanatory theories do not count as *knowledge* since they are always subject to revision. This seems counter-intuitive. The alternative is to say that the pre-Einsteinian physicists did *know* Newton's laws, but then *knowledge*, presumably, has to simply be analysed as justified belief JB (including justified false belief). Mathematical knowledge in contrast is provably true, but this means simply that it is internally consistent (i.e. consistent with axioms and logical laws). Mathematical knowledge makes no claims about a "real" world beyond the realm of its own propositions;⁶ it is non-realistic knowledge.

⁵ With the exception of light.

⁶ Propositions are often held to be abstract objects, like numbers. In Footnote 3 above, the first part of the definition holds in this abstract sense, i.e. a proposition is "a thing that can be true or false". However, the second part, that a proposition can complete a *sentence* like *I believe that*_____ is not true in this abstract sense since a sentence is an utterance, and is thus part of the real world. A proposition can be expressed in a *clause*, and a clause can complete the sentence template. This is discussed further in Chapter 4.

Alternative resolutions to the problem of fallible knowledge include the position that it is “true under some circumstances”, was “true at the time” or was “true for them”. Newton’s laws of motion are strictly not true under any circumstances, but for most practical Earth-bound purposes, they are “true enough”. That is, they correspond to reality to a degree that is sufficient for most purposes, or, they disagree with reality to such a small extent that no one normally notices any discrepancy. Newton’s laws are taught in school as facts. The idea that a proposition can be true at one time and not at another is not problematic *per se*. For example *the year is 1980* used to be true, but it is not true anymore. But were one to find out that, in fact, it had never been 1980 because of some fantastic miscalculation in the Gregorian calendar system, one would be more likely to say *people thought it was 1980* rather than *people knew it was 1980*. If that calendar system is correct, then what about people using the Korean calendar, who thought at the time that the year was 4313? Or did they *know* it was 4313? Was it simultaneously true for me that it was 1980, and true for people living in Korea that it was 4313? This last question seems to have a deflationary answer that, yes, we were of course both correct because 1980 is 4313 in the Korean system. They are just different ways of saying the same thing. To put it another way, one version is true-in-English and the other is true-in-Korean. And in this case, to translate between the systems, you just have to add 2333. Translating non-mathematical ideas between languages is not so straightforward, and may not always be possible. This idea is reflected in Wittgenstein’s (1953) notion of self-contained *language games* which share *family resemblances*, but possibly not an exact equivalence.

So, the truth criterion comes in two major varieties: realism and non-realism. Assuming one commits to either version, one is compelled to also hold various supplementary beliefs due to the above considerations, e.g. that truth is local or universal. A similar situation obtains for the justification criterion: it comes in different types that entail different supporting beliefs, depending on how one answers the question: What kind of justification “counts” as adequate for the acceptance of a belief? I explore this question next in the context of so-called *Gettier problems*.

The JTB analysis of knowledge was the consensus view from antiquity until the mid-twentieth century when Gettier (1963) adduced some instances of justified true belief that do not seem to count as knowledge. Here is one such Gettier problem developed by Goldman:

Consider the following example. Henry is driving in the country-side with his son. For the boy’s edification Henry identifies various objects on the landscape as they come into view. “That’s a cow,” says Henry, “That’s a tractor,” “That’s a silo,” “That’s a barn,” etc. Henry has no doubt about the identity of these objects; in particular, he has no doubt that the last-mentioned object is a barn, which indeed it is. Each of the identified objects has features characteristic of its type. Moreover, each object is fully in view, Henry has excellent eyesight, and he has enough time to look at them reasonably carefully, since there is little traffic to distract him. Given this information, would we say that Henry knows that the object is a barn? Most of us would have little hesitation in saying this, so long as we were not in a certain philosophical frame of mind. Contrast our inclination here with the inclination we would have if we were given some additional information. Suppose we are told that, unknown to Henry, the district he has just entered is full of papier-maché facsimiles of barns. These facsimiles look from the road exactly like barns, but are really just facades, without back walls or interiors, quite incapable of being used as barns. They are so cleverly constructed that travelers invariably mistake them for barns. Having just entered the district, Henry has not encountered any facsimiles; the object he sees is a genuine barn. But if the object on that site were a facsimile, Henry would mistake it for a barn. Given this new information, we would be strongly inclined to

withdraw the claim that Henry knows the object is a barn. How is this change in our assessment to be explained?

(Goldman 1976: 772–73)

Throughout this example, Henry apparently holds a true belief that an object he sees is a barn. In the first part of the scenario, this true belief is adequately justified by his looking at the object ‘reasonably carefully’. However, once we find out that there are facsimile objects about, this method of justification no longer seems adequate, and we are therefore unwilling to say that Henry *knows* that the object is a barn. One possible reason why the method of justification is no longer adequate is that it no longer rules out the possibility that Henry could hold a true belief by accident. Even though we know that he happens to be right in this case, the fact that his method of justification is too weak to work in general means that in this case—where his belief is actually justified—no longer counts as knowledge! Justification has to be reliable. This leads to the position of so-called *reliabilism*.⁷ But what makes a method of justification reliable?

Armstrong (1973) suggested that a belief is reliable if its truth is *nomically* caused, i.e. caused by the laws of nature. This is a generalization of Dretske’s (1971) notion of a *reliable indicator* (see also Swain 1981; Alston 1988). For example, a thermometer indicates the temperature, and on the basis of reading the thermometer, we can know the temperature. In this case, we are aware of how we know what the temperature is: the justificatory process is available to our conscious reflection. One popular example in the epistemology literature of reliable justification that is not available to conscious reflection is the case of Mr Truetemp (Lehrer 1990). Mr Truetemp’s brain has been rewired so that he is

⁷ Or ‘process reliabilism about justification’ (Goldman 2011).

always able to estimate the temperature correctly, but he is not aware that his brain has been so rewired. When he believes, correctly, that it is 22 °C, would you say he *knows* the temperature? This question tends to divide people (see e.g. Weinberg *et al.* 2001). Those that say that Mr Truetemp *knows* the temperature, because he is in possession of a justified true belief, are *externalists* about justification. For externalists, it does not matter that Mr Truetemp does not know how he knows the temperature, or even that he does not necessarily know that he knows the temperature. It is sufficient merely that his true belief is reliably justified (in a mind-external manner). Those that reject this position and say that indeed Mr Truetemp does not know the temperature—precisely because he does not know how he came to know it—are *internalists* about justification. Internalists require that a knower have reflective access to the justificatory process, i.e. that justification be mind-internal.

The JTB analysis of knowledge ($K = JTB$) thus consists of at least two broad positions about justification (internalism versus externalism), as well as at least two broad positions about truth (realism and non-realism). It is also possible that knowledge could be analysed as JB or JT in some situations (such as the pre-Einsteinian physicists and the calculator respectively). In principle, one could identify knowledge with belief ($K = B$), e.g. in the case of *fideism* about religious knowledge (see e.g. Plantinga 1983). In this latter case, the details of truth and justification are irrelevant, or, alternatively, faith could be viewed as a self-justifying route to true belief. This has some parallels with the thesis that knowledge may be best regarded an un-analysable primitive concept after all (see e.g. Williamson 2000).

Given these principal distinctions in the classical analysis of knowledge, there are a number of possible positions about what knowledge is. Figure 1.1 illustrates this. If all three components of JTB are required for knowledge, then there are four analyses of knowledge possible (shown in the top row). For example, $\langle K_{JTB}, T_{real}, J_{int} \rangle$ represents the position that knowledge is JTB, realism about truth, and internalism about justification. If the definition of knowledge includes fewer components, then there are fewer permutations, with the analytically simplest choice being fideism ($K = B$). The arrows simply represent all the ways to remove one criterion at a time from JTB down to B. Given the *know/knowledge* distinction (JTB versus B(JT)), this diagram represents half of the typology possible based on the discussion so far. If the B for belief criterion is removed from every element, then the same number of typological possibilities exists, with the bottom row being the null case $\langle K_o \rangle$ which requires none of the JTB conditions to be met in order for something to count as knowledge.

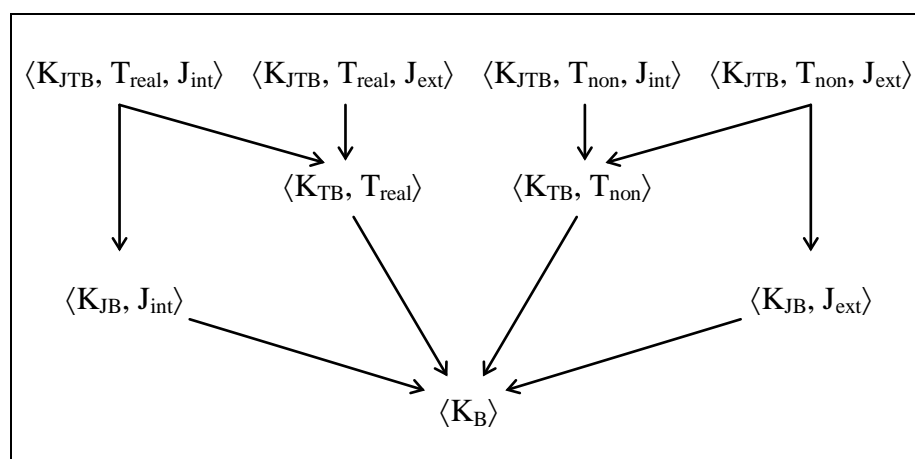


Figure 1.1 Some possible analyses of know/ledge

Given an analysis of knowledge, it is possible to ask whether somebody knows something or not. To answer the question, one merely has to inspect the scenario and determine whether the criteria in the chosen analysis have been met. For example, given an analysis of knowledge $\langle K_{JB}, T_{non}, J_{int} \rangle$, did the pre-Einsteinian physicists have knowledge of Newton's laws of motion? Well, they believed them, so the B criterion is met. The laws matched every experiment that could be done at the time, so the laws were "true for them", i.e. they were true in a non-realist sense of truth, so the T_{non} criterion is met. Indeed, experimental data counted as evidence that the laws were true, and physicists had access to this evidence and could reproduce it. So they would have been justified in holding the belief that the laws were correct, and furthermore they would have had reflective access to this justification, so the J_{int} criterion is met. So, all conditions of the analysis are met, and we can say that the physicists did have knowledge of Newton's laws of motion. If we judged the case according to a weaker analysis of knowledge such as $\langle K_{JB}, J_{ext} \rangle$, then we can still attribute knowledge. In this case, the B condition is met as before, and the J condition is met because if the J_{int} condition is met, then the J_{ext} condition is met. This is because, in order for someone to have reflective access to a reliable method of justification (as required by internalism J_{int}), there must exist a reliable method of justification (as required by externalism J_{ext}). The reverse implication is not true.

In practice, it might be very difficult to determine whether the criteria of some analysis of knowledge have been met (unless one commits to the null analysis K_0). In other words, it might not always be possible to determine whether or not someone *does know* something. Epistemologists have also been concerned

with the related but more fundamental question of determining whether or not someone *can know* something. In other words, given an analysis of knowledge, is it in fact ever possible to meet the criteria? There are three main responses to this question: yes, no, and maybe. Klein (2014) labels these positions respectively as *epistemism*, *Academic skepticism* and *Pyrrhonian skepticism*, and I will summarize his review of those terms now.

Epistemism is the position that we can have knowledge. All of the preceding discussion has tacitly assumed an epistemist position. This might be regarded as the “commonsense” position: “Of course we can have knowledge! How is that even a question?”

Academic skepticism is the most radical form of doubt possible. It consists in denying that we can know anything. This has been variously called *Cartesian skepticism* or *possible worlds skepticism*. Klein (2014) gives the example of the film *The Matrix* to illustrate the latter term. In *The Matrix*, most people are living in a computer simulation that appears totally real to them. Given that this is a possible scenario that could actually be happening right now, how could we ever know about it? If we cannot know whether the whole of what we think of as reality is actually a simulation, then how can we know anything? (Cf. Putnam’s 1981 discussion of the “brain in a vat” scenario).

In terms of propositional knowledge, this raises another problem. Academic skepticism says that there are no knowable propositions. But, *there are no knowable propositions* is itself a proposition. Academic skepticism applied to propositional knowledge thus appears to be self-contradictory. One remedy to this is to commit to neither epistemism nor Academic skepticism. This position of

withholding assent is referred to by Klein as *Pyrrhonian skepticism*. (Note that we are compelled to formulate Pyrrhonian skepticism as ‘withholding assent’ rather than positively rejecting epistemism in order to avoid the same kind of self-contradiction as in Academic skepticism.) I will discuss a second remedy in Section 1.2.1 below.

These three responses to skepticism may apply to any of the analyses of knowledge presented above. This gives $3 \times 2 \times 9 = 54$ possible positions. I will symbolize the three positions on skepticism as S_+ , S_- and S_o , i.e., respectively, the position that we can have knowledge, that we cannot have knowledge, and the position of withholding commitment to either S_+ or S_- . This typology has only so far included the principal points of distinction in classical epistemology. There are many others. However, now that I have shown how it is possible to describe epistemological variation in an abstract way with this restricted typology, I will in the next section consider how this typology can be applied to individuals and communities.

1.2 Knowledge in a social world

The above discussion makes it clear that the criteria for attributing knowledge to somebody are in dispute among epistemologists. The fields of social epistemology and experimental epistemology have made further contributions to our understanding of the nature of knowledge. In this section I discuss the idea of a *social epistemology* and elaborate on the notion of *epistemic policy* (van Fraassen 2002; Teller 2004). I develop a typology of epistemic policy which includes the

analysis of knowledge and skepticism from the last section. I then show how I will apply this typology to the case of academia. In Section 1.3 I foreshadow some methodological considerations for this thesis.

The field of epistemology has been complicated by criticisms of the analytic approach itself. Classical epistemology is reductive in that it assumes that knowledge, however characterized, is the same thing for everybody at all times. Critical approaches to epistemology reject this assumption, and have therefore been collectively called ‘anti-classical approaches’ to epistemology (Goldman 2010). In other words, anti-classical epistemology claims that knowledge cannot be treated as ‘context-free or super-cultural’ (Barnes and Bloor 1982: 27). In terms of the T criterion, epistemologists can approach the analysis of knowledge as either realists or non-realists about truth. Classical epistemologists might presuppose an analysis of knowledge (e.g. JTB) and then use that for framing their investigations of knowledge as an object. Anti-classical epistemologist might in contrast reject this approach because, if the JTB analysis turns out to be false, it would only be false within an analysis that had already presupposed it! We can side-step this contradiction, but not the substantive challenge it raises for classical epistemology, with the notion of epistemic policy developed in the next section.

Classical epistemology is also individualistic, i.e. it assumes that knowledge is possessed by individuals, while social epistemology assumes that knowledge is irreducibly social. This social aspect of knowledge refers not just to the culturally-embedded nature of knowledge production, but also to the possibility of knowledge being distributed among more than one individual e.g. in a committee or research institution. We saw in the discussion above that it is

plausible for *knowledge* to be instantiated in an inanimate object, but not for that object to *know* anything. When it comes to committees or organizations, this distinction is less clear (e.g. *The Government knows exactly what it is doing*). I will be concerned in this thesis with the case of academia, and will sometimes write of disciplines or the academy knowing things or ratifying positions on knowledge. By this I simply mean that there is some degree of consensus within that level of organizational structure in respect of that knowledge or belief.

In this thesis, then, I modestly assume that I am uncovering “facts”, i.e. finding out things that obtain in the actual world. The object of my enquiry is the linguistic construction of epistemic commitments. A linguistic constructionist approach to epistemology is an anti-classical approach in the sense that I am not aiming to uncover a universal analysis of knowledge that transcends the particularities of human society. Rather, I am concerned with the mutually constitutive relationship between linguistic variation and epistemological variation: the way these variations maintain one another. To investigate this relationship, I focus on the discursive processes that create and maintain epistemic beliefs. In other words, I am more interested in what people *believe* and *say* about knowledge than what knowledge *is* in the abstract, because I maintain that what people believe about it, say about it, do with it, elucidates the meaning of knowledge more powerfully than an armchair analysis grounded in a monolithic conception of “natural” language ever could.

1.2.1 Epistemic policy

I argued in Section 1.1 that a classical, ordinary-language analysis of knowledge requires that in order to *know* a proposition *p*, you have to *believe* that *p*, and *p* has to be *justified* and *true*. I symbolized this analysis of knowledge as JTB or B(JT).⁸ Immediately this raises questions such as: Whose language? What is “ordinary” language? What is belief? What is justification? And what is truth? I propose that the answers to these questions are partially constitutive of an *epistemic policy*. An epistemic policy is an experience filter: a way of seeing and interpreting the world. It comprises an analysis of knowledge (e.g. ‘knowledge is JTB’), ways of finding things out (e.g. introspection, experiment, prayer), and it is imbued with *values*, *attitudes* and *norms* i.e. *non-propositional content* (see below). We all have several epistemic policies at our disposal that are suited better to particular epistemic tasks. For example, to find out where I left my keys, I will use introspection, and I may re-enact what I did the last time I had them. These ways of finding things out may be unreliable, but they seem to me to be appropriate for the task: they are in principle capable of producing an answer to my question, even if that answer is doubtful and imprecise. I would not try reading about the history of keys, doing an attitude survey about keys, or working out what type of metal the lock was made of. These ways of finding things out, while perhaps more reliable, do not speak to the question at hand. They draw my attention towards data that do not bear on the question of where my keys are; they are ways of

⁸ B(JT) means belief in a justified truth. Justified truths can be called *knowledge* (e.g. knowledge stored in a book), but it would be odd for many people to say that a book *knows* anything. The verb *know*, then, seems to require *belief* by a knowing subject, while *knowledge* seems to be able to exist without a knower.

seeing the world that, given my immediate goals, lead not to false information, but to the “wrong kind” of knowledge.

In all of the epistemic policies just mentioned, it would be possible to maintain an analysis of knowledge as JTB. That is, to remain committed to the idea that for me to *know* that *p* means that *p* is justified, true and that I believe that *p*. If I dispensed with the truth criterion, so that knowledge was JB then I would already know where my keys were: they would be anywhere I (justifiably) believe them to be (e.g. *I believe that the keys are in the fridge because that's where I keep lots of important things*). It's very difficult to imagine ever applying this definition of knowledge for the purpose of finding a set of keys because when you went to get your keys, you would invariably find them absent from where you expected, but then still insist that you *know* where they are since the truth of the matter is irrelevant to knowledge. Furthermore, many non-realist notions of truth are also vulnerable to this kind of problem in the key-hunting scenario. For example, if I committed to a theory of knowledge as JTB, but assumed non-realism about truth, then I might be able to say *it's true for me that the keys are there* even if everyone else insisted that they were not.

Non-realism about truth is, then, perhaps an unlikely commitment given the task of looking for keys. It is however much more obviously appropriate for finding out about people's perceptions of pain, or generating emotional responses or aesthetic judgements to research objects, where *truth* is more likely to be seen as being a subjective matter. Epistemic policies, then, are useful in different circumstances. In other words, epistemic policies are beliefs, attitudes and norms (as defined below) relating to knowledge in particular contexts.

I said above that social epistemology regards knowledge as ‘irreducibly social’. One interpretation of this is that the criteria for knowledge are subject to social influences rather than being ‘context-free or super-cultural’. In other words, what knowledge is depends on how people use it. This means that intuitions from the armchair cannot be relied upon to reveal the nature of knowledge; even if people were consciously committed to e.g. realism about truth, their commitments would be subject to change because of social facts. Elzinga’s (1985, 1987, 1997) notion of *epistemic drift* describes ‘the tendency for epistemic criteria to drift from ones that are likely to push back the frontiers of knowledge to ones that are likely to serve some socially desirable ends’ (Fuller 2002: xxi):

In the extreme the regulative governing internal quality control may be crowded out, whence research becomes directly instrumentalized and assessed in respect to its utility in society, in practices outside science; what was research ceases to be the kind of investigative process we normally associate with research. On the other hand, in less extreme cases relevance and accountability pressures may be accommodated while upholding internalist quality control mechanisms, in which case the content of research agendas may undergo substantial change, and new fields opened.

(Elzinga 1997: 423)

Fuller argues that such ‘perversions of the research agenda’ are not as insidious as ‘the tendency for measures of *reliability* to be used as surrogates for measures of *validity* in the evaluation of knowledge claims.’ (2002: xxi–xxii, original emphasis). In other words, while Elzinga is concerned that the relationship between power and knowledge is distorting what gets researched, Fuller is

concerned that it is distorting what counts as knowledge. It is this latter possibility that I engage with in the present thesis.

The notion of epistemic drift illustrates how the social context of knowledge formation can change what *knowledge* means. The notion of epistemic policy captures the synchronic aspect of this variability in how knowledge is conceived of, and I will elaborate its non-propositional content in order to illustrate this. I said above that an epistemic policy is a ‘belief-forming strategy’, but it also comprises attitudes, values and norms related to the nature of knowledge. For example, an epistemic policy may include the *belief* that the correct analysis of knowledge is $\langle K_{JTb}, T_{real}, J_{ext} \rangle$. *Belief* is a ‘propositional attitude’ (see e.g. Russell 1956), i.e. it is a mental relation that one can bear to a proposition, but one could equally well *doubt*, *think*, or *consider* that knowledge is $\langle K_{JTb}, T_{real}, J_{ext} \rangle$. *Attitudes* comprise affective responses, positive and negative evaluations and behaviours (Maio *et al.* 2003), and they can be about abstract objects like knowledge and ideas (Bohner and Dickel 2011: 392). ‘*Values* are widely considered to be largely stable social and internal constructs that guide social evaluation and action’; they are a more persistent form of attitudes which ‘transcend specific situations’ (Schwartz and Bilsky 1987: 551, my emphasis). *Norms* are ‘the customary rules that govern behavior in groups and societies’ (Bicchieri and Muldoon 2014). Bem (1993) uses the metaphor of the lens to describe norms: ‘every culture has hidden assumptions that act as cultural lenses through which members of society view and shape the world’ (Preves and Mortimer 2013: 151).

The inclusion of this non-propositional content in the theoretical construct of epistemic policy allows us to side-step the problem of Academic skepticism. Van Fraassen (2002: 46–48) argues that epistemic policies are not the same kind of thing as beliefs.⁹ Since epistemic policies are to some extent values, they are supposed to be immune from their own epistemic effects: they are not subject to falsification. Values are not candidates for truth and falsity. In short, by incorporating unfalsifiable attitudes into epistemic judgements, we insulate those judgements from epistemic scrutiny. This means that we can deny the possibility of knowledge, for example, without thereby denying that that position may itself be guided by attitudes, values and norms. The inclusion of non-propositional content saves Academic skepticism from self-contradiction, but the price is an analytically less tractable epistemology.

1.2.2 Epistemic policy range: The case of academia

So, everyone has multiple epistemic policies at their disposal for different purposes. In principle, these policies can be very divergent and cover a wide swath of the typological space. In the case of academic disciplines, epistemic policies are routinely made explicit in order to bolster one's knowledge claims, and, indeed, so as to be seen to be making a legitimate knowledge claim at all. Epistemic policies, when made explicit, can be more easily interrogated and

⁹ van Fraassen's (2002) work *The Empirical Stance* gave a seminal account of belief-forming practices, but I use Teller's (2004) term *epistemic policy* instead of the more perspicuous and philosophically usual term *stance* because I will also be using the sociolinguistic notion of stance throughout this thesis. Both disciplines use the term stance to connote a position or point of view, although sociolinguists are especially concerned with the linguistic materialization (and reproduction) of stance (see Chapter 2). van Fraassen's conception of stance is somewhat idiosyncratic in philosophy, in that he supposes that a stance is not subject to rational interrogation or defence. This makes it potentially closer to the sociolinguistic notion of stance as a more fleeting, intersubjective and mutable position-in-interaction.

challenged. Part of becoming socialized into an academic discipline is becoming attuned to the epistemic policies that have survived such challenge and are thus deemed to be acceptable according to that discipline's *consensus practice* (Kitcher 1993). For example, externalism about justification is a difficult position to maintain; it is generally only ratified in the academy as an informal guide to thinking (e.g. following a "hunch"). Sometimes it is possible in a research context to assert that things are self-evident, but reference to a reliable justification is normatively held to be preferable. Socialization into a discipline, then, requires a narrowing of one's epistemic policy range (EPR), i.e. it requires one to set aside epistemic policies that one's discipline does not ratify.

Which epistemic policies are ratified by which disciplines? To approach this question, I next review Becher and Trowler's (2001) synthetic account of several typologies of academic disciplines, and then go on to argue that disciplinary consensus practice for the acquisition or manufacture of knowledge may be characterized using the system of epistemic policies so far described. I also argue that these epistemological foundations constrain and partly define research methodologies available to a particular discipline.

Becher and Trowler (2001: 23–36) develop a typology of disciplinary epistemology by first considering Pantin's (1968) distinction between *restricted* and the *unrestricted* sciences. The examples elaborated by Pantin are, respectively 'the physical sciences' and 'the biologies', the former of whose investigators 'are restricted in the field of phenomena to which they are devoted', while the latter 'must be prepared to follow their problems into any other science whatsoever' (quoted in Becher and Trowler 2001: 32). Pantin explains that the restriction of

physical sciences to a relatively small class of phenomena and variables accounts for the relatively greater power to generalize of physical sciences compared to biological sciences. A first dimension of difference across academia then, is the tendency to generalize. Pantin argues that this tendency is embedded in disciplinary (methodological) practice as the tendency for a subject to isolate itself from inter-disciplinary elaboration:

general-restricted ←-----→ specific-unrestricted

Kuhn (1962) developed the idea that knowledge, especially in the sciences, proceeds by “saltatory evolution” from one period of relative stability, called a *paradigm*, via a critical accumulation of evidence that the paradigm is not correct, to an abrupt transition to a new paradigm. Kuhn varies in how he applied the term paradigm, but we can think of it as a discipline’s “grand narrative” or “unifying theory”. Kuhn thus challenged the idealized account of science as dispassionately abandoning theories that no longer seem to fit the data, instead arguing (following Planck 1949) that disciplines hang on to moribund theoretical constructs more or less until the death of the generation of theoreticians that champion them. Kuhn argues that while this picture of disciplinary science as relying heavily on the personalities of its practitioners explodes the high ideals of science, there is nonetheless a general progression from pre-paradigmatic disciplines towards paradigmatic disciplines in the academy. In other words, even though paradigms are normally ultimately abandoned, there is still a tendency for new disciplines to move towards theoretical coherence. Once a paradigm is established, disciplines

may then enter progressive rounds of paradigm shifts. This yields a second dimension of difference across academia:

pre-paradigmatic ←-----→ paradigmatic

It should be noted that paradigm shifts may or may not include revision of epistemic policies: that would probably be better characterized as the emergence of a new discipline, or as a break from academia all together. Hyland (2006: 25–26) suggests that the use of citations in research articles can indicate the stability of a paradigm. He argues that ‘scientists participate in relatively discrete areas of study and their research proceeds along well defined paths, so they can presuppose a certain amount of theoretical, background, procedural expertise and technical lexis’. In other words, a well-established paradigm that is widely known does not have to be explicitly justified in every research article: it can simply be tacitly assumed.

Becher and Trowler (2001) note that both the above dimensions arise from observation of how disciplines function as social groups, and they go on to contrast this with two typologies that arise from consideration of differences in subject matter across academia. Biglan (1973) used survey data of around 200 faculty members at two universities, and Kolb (1981) used a psychometric test (Kolb Learning Style Inventory) of 800 practitioners and students of management. Becher and Trowler (2001: 35) bring the analyses of these data together into a two-dimensional (Kolb-Biglan) typology:

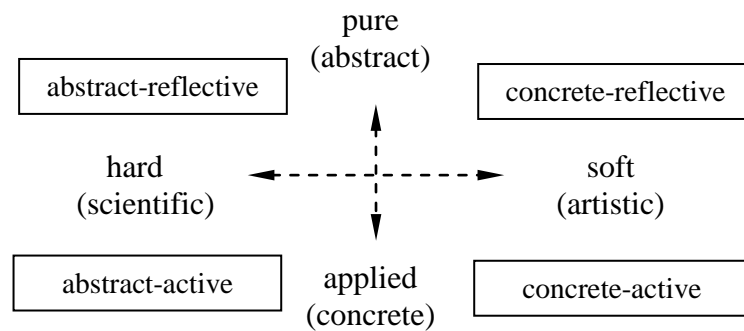


Figure 1.2 Kolb-Biglan typology of academic disciplines

The four quadrants are labelled with Kolb's terminology. I will adopt this classification, but will retain Biglan's terminology after Becher (1994) who argues in Becher and Trowler (2001) that Biglan's terminology is more transparent. Examples of disciplines are given in Table 1.1 below in quadrants labelled with Biglan's terms, and elaborated with example characteristics of knowledge (adapted from Becher 1994).

Table 1.1 Knowledge in academic disciplines

Hard-Pure	Soft-Pure
Pure sciences, e.g. physics	Humanities, e.g. history and pure social sciences (e.g. anthropology)
<ul style="list-style-type: none"> • cumulative • atomistic • concerned with universals, quantities, simplification ('reduction') • impersonal, value-free • clear criteria for K verification/obsolescence • consensus over questions to address • results in discovery/explanation 	<ul style="list-style-type: none"> • reiterative • holistic • concerned with particulars, qualities, complication ('problematization') • personal, value-laden • disputed criteria for K verification/obsolescence • no consensus over questions to address • results in understanding/interpretation
Hard-Applied	Soft-Applied
Technologies, e.g. mechanical engineering, clinical medicine	Applied social science, e.g. education, law, social administration
<ul style="list-style-type: none"> • purposive • pragmatic (know-how via hard K) • concerned with mastery of physical environment • applied heuristic approaches • uses both qualitative and quantitative approaches • criteria for judgement are purposive/functional • results in products/techniques 	<ul style="list-style-type: none"> • functional • utilitarian (know-how via soft K) • concerned with enhancement of practice • uses case studies and case law • results in protocols/procedures

Becher and Trowler (2001) note that this typology is a generalization, and I note that its utility in predicting and explaining linguistic phenomena depends on the extent to which the informants used subscribe to its validity¹⁰. It remains to be seen how forthcoming participants will (or can) be with their epistemic policies. For example, Schwarz (2004) analyzed the views of a group of scientists and found a rather vague general agreement that certainty "trumps" uncertainty, but no consensus on the exact meaning of, or mechanism of transition between, scientific hypotheses, theories and laws.

¹⁰ This will be investigated in interview (see Chapter 5).

Table 1.1 is suggestive of the range of epistemic policies ratified by different disciplines. There are several points of contact with the epistemic policy typology developed above. The lower half of the table represents disciplines that are more concerned with know-how, and these are not the focus of the present work. ‘Concerned with universals’ and ‘cumulative’ versus ‘concerned with particulars’ and ‘reiterative’ relates to the T criterion. Universals correspond to realism about truth, while particulars suggest a non-realist conception of truth. The idea that hard-pure subjects are ‘value-free’ stands at odds with the notion of epistemic policy developed in this chapter. Academics in those fields may *believe* that their research is value-free, but I argue that it is not. Rather, values, attitudes and norms shape the way that academics *see* facts. ‘Clear criteria for K’ implies a narrow epistemic policy range (EPR) for the hard-pure subjects, and ‘disputed criteria for K’ implies a wide EPR.

I argued above that it is possible for an individual to adopt one epistemic policy for one purpose, and then to switch to a different one for another purpose. For example, suspending one’s disbelief is appropriate while watching a film, but not while driving a car. The same phenomenon or situation can be viewed by different individuals through the lens of different epistemic policies. An academic example is that critical theory can be applied to natural phenomena via the postmodern notion of “nature as text”, while natural phenomena can also be approached “naturalistically” as in “normal science”. The field of science and technology studies (STS) focuses on the discourses of science, i.e. the ideological and institutional constraints on language which shape scientific theories (see e.g. Latour and Woolgar 1986; Ross 1996). Scientists typically reject the idea that

such discursive processes can have any substantive effect on their theories (see e.g. Gross *et al.* 1996; Gross and Levitt 1998; Sokal 2008).

From within the framework of epistemic policy, neither of these approaches is “more correct” than the other because they are differentiated in terms of their values, including what they are trying to achieve.¹¹ If one rejects the epistemic policy construct, and instead holds that epistemological positions reduce to analyses of knowledge, then one might rather argue that one or other analysis is better than the other because values do not come into it.

These differing positions on the influence of discursive/linguistic processes on the content of theories highlight a further epistemic policy distinction, which relates to the researcher’s own position with respect to their object of study. Are they trying to view it dispassionately, in isolation from social and political factors, or are they “involved with” their research object? In short, is their relationship to their research one of objectivism or subjectivism? I will call these opposing positions investigative policies, I-policies, and symbolize them as I_{obj} and I_{subj} .

Postmodernism, and critical theory in general, have not penetrated the popular consciousness to the same extent that “science” has. It is fairly safe to say that there are some people in the world who never approach a natural phenomenon “as a text” even when marvelling at the beauty of a mountain range. Some epistemic policies are not widely available, whether because they entail ways of seeing that are innovative and hence not widely known, or because they are widely known and widely dismissed (as in the driving example above). This

¹¹ Sam Harris’s (2010) book *The Moral Landscape: How Science Can Determine Human Values* is the most successful recent popularization of the thesis that values are a type of fact. Mainstream philosophy was not persuaded.

means that some people have a more extensive range of epistemic policies at their disposal than others, and I refer to them as having a wide *epistemic policy range* (EPR).

Institutions can have wide or narrow EPRs too. The National Institute of Clinical Excellence (NICE) in the UK has made its EPR explicit in the form of hierarchies of evidence (NICE 2007). For example, the poorest form of evidence for studies of the accuracy of diagnosis is ‘Consensus, expert committee reports or opinions and/or clinical experience without explicit critical appraisal; or based on physiology, bench research or ‘first principles’’, while the best form of evidence is ‘Systematic review (with homogeneity) of level-1 studies’ (NICE 2007: 47). Interpreting the patient as text does not feature in this hierarchy, and NICE would in fact regard it as an unacceptable epistemic policy for diagnosis.

Regarding an epistemic policy as unacceptable is itself an epistemic policy. An obvious response to the paragraph above is “Of course NICE does not want a postmodern critique of signs and symptoms: it wants to ensure that people get diagnosed and treated quickly and safely, and postmodern criticism cannot do that”. But this explanation is in terms of what NICE *wants*, which is to say that the diagnosis and treatment of patients are value-laden aims. In the case of acute life-threatening illness, most people might share those values, but in the case of e.g. non-acute psychiatric conditions, the degree of consensus is likely to be considerably lower. Psychiatry, and especially the closely allied discipline of clinical psychology, do not find postmodern epistemic policies unacceptable. Individual psychologists may be highly skeptical of the utility of textual approaches to counselling, but the discipline as a whole is a “broad church” with a

wide EPR, containing individual members with both wide and narrow EPRs (see e.g. Gergen 2001).

An academic discipline is another type of institution that has a consensus on the epistemic policies that it deems appropriate for generating its knowledge. This disciplinary policy range is reflected and constituted by the practice of its individual members who as a group adopt a set of epistemic policies. For example, the policy adopted in the discipline of physics for the purpose of doing an experiment may include the following elements:

$$\langle S+, K_{JTB}, J_{int}, T_{real}, I_{obj} \rangle$$

In other words, the epistemic policy adopted for a physics experiment may assume that knowledge can be acquired, that knowledge is JTB, that justification has to be internal, that truth is “out there in the world” to be discovered, and that a stance of objectivity is the best way to go about finding out what that truth is. This could be materialized linguistically in an utterance of the following type:

First, observe that a reasonable observer considering implicational concepts must pick some upper limit of the degree K of concepts to be considered—simply because including the maximum of $K = D - 1$ provides complete expressive power and hence zero inductive power (see discussion of the bias-variance tradeoff above).

(Feldman 2006: 362)¹²

The author instructs the reader to ‘observe’, assuming that the observation available to the reader is the same as the observation available to the author. This

¹² This is actually a paper from the *Journal of Mathematical Psychology*.

suggests an I-policy of objectivity. He does however require that an observer be ‘reasonable’, suggesting that observation is interpretive, but also suggesting that there is one particular outcome that would be the right one (T-policy of realism). The force of the epistemic modal verb *must* derives from a logical deduction, the premise of which linearly follows the conclusion in this quote. This suggests an affiliation with rationalism, and by association, classical epistemology (i.e. an S-policy of epistemism, and K-policy of K_{JTB}). Since a justification is being made explicitly in this excerpt, it seems likely that the author requires that justification be made explicit in order to adequately communicate the knowledge itself (i.e. J-policy of internalism).

I will illustrate an apparently contrasting epistemic policy in this quote from Lyotard’s (1984) *The Postmodern Condition: A Report on Knowledge*:

Rather than painting a picture that would inevitably remain incomplete, I will take as my point of departure a single feature, one that immediately defines our object of study. Scientific knowledge is a kind of discourse. And it is fair to say that for the last forty years the “leading” sciences and technologies have had to do with language: phonology and theories of linguistics, problems of communication and cybernetics, modern theories of algebra and informatics, computers and their languages...

(Lyotard 1984: 3–4)

The first clause suggests that our knowledge (in this case our knowledge of historical context) is always partial, since it is inevitable that any mental (or linguistic) representation of it is incomplete. This suggests a more skeptical S-policy than the Science example above, perhaps Academic skepticism $\langle S- \rangle$, at least with respect to historical knowledge. The scare-quoted “leading” is somewhat derisory, suggesting that Lyotard views scientific inquiry as

hegemonic, i.e. dominant for political or ideological reasons rather than because of its epistemic merits. On the other hand, the author uses the word ‘inevitably’ which suggests certainty about the following proposition, implying an S-policy of $\langle S+ \rangle$. This may then imply an S-policy of $\langle S_0 \rangle$, i.e. of not committing definitively either way about whether knowledge is possible or not.

Lyotard goes on to say that ‘Scientific knowledge is a kind of discourse.’ (1984: 3), which resonates with the dialectic and hence intersubjective, suggesting an I-stance of subjectivity. This analysis is supported by the author’s use of the first person pronoun *I*, through which the author situates his message relative to himself. $\langle I_{\text{subj}} \rangle$ seems to suggest $\langle T_{\text{non}} \rangle$, that is, an investigative policy element of subjectivity seems to require a T-policy element of non-realism.

If knowledge is a discourse, then it is unlikely to have a universal and unchanging character, so Lyotard’s K-policy is either that K_{JTB} , or K_{JB} . I include the final partial sentence since it may indicate something about the kind of justification that Lyotard accepts for knowledge. No doubt *it is fair to say* is a reasonably common form of words that has been somewhat semantically bleached, however it seems to offer a justification on the basis of intuition rather than explicit logical argumentation. This suggests that his J-policy is not one of (explicit) internalism, i.e. not relative to an explicit chain of reasoning.

Already it is clear that the task of diagnosing someone’s epistemic policies from their utterances is going to be difficult. Disciplines may make their epistemic policies explicit, and so too may individuals, but it is likely that epistemic policies will not normally be clear from the form of a stance. I therefore approach the relationship between epistemological variation and linguistic variation in an

iterative manner. I propose a model of epistemological difference in academic disciplines next; then, I propose some possible linguistic correlates of these epistemological differences in Section 1.3. In Chapter 2 I approach this correlation from the linguistic side to reach a more refined model of the relationship between epistemological variation and linguistic variation. I then test this model empirically in Chapter 3, and then refine and re-test in Chapters 4 and 5.

I suggested above in the discussion of Lyotard's epistemic policy that certain forms of epistemic policy elements seem to be incompatible with others. For example, an investigative policy element of objectivity $\langle I_{obj} \rangle$ seems to imply realism about truth $\langle T_{real} \rangle$. This means that this pair of policy elements can combine in 4 different ways: $\langle I_{subj}, T_{real} \rangle$, $\langle I_{subj}, T_{non} \rangle$, $\langle I_{obj}, T_{real} \rangle$, $\langle I_{obj}, T_{non} \rangle$.¹³ Now, what would it mean to have a policy of $\langle I_{obj}, T_{non} \rangle$? To be treat reality as mind-independent such that one can approach it objectively, but also to hold that truth itself is not out there waiting to be observed, but somehow constituted in the act of observation? This seems to be contradictory. This policy may be defensible in the case of e.g. quantum mechanical phenomena. It seems to require para-consistent logic, e.g. the possibility that a proposition p and its negation $\neg p$ could be simultaneously true. This is a rather exotic position which is not directly relevant to the present early research into the relationship between epistemological and linguistic variation. Thinkers (and laypeople) have historically been very reluctant to abandon the law of non-contradiction, as illustrated by this quote from Ibn Sina (Avicenna):

¹³ Let us assume that, while it is possible to dispense with the T-criterion in one's K-policy and hold that knowledge is JB, one still has to have a position on what truth is.

Anyone who denies the law of non-contradiction should be beaten and burned until he admits that to be beaten is not the same as not to be beaten, and to be burned is not the same as not to be burned.

(Ibn Sina, *Metaphysics* I.8, 53.13–15)¹⁴

This is of course itself an epistemic policy. Avicenna evaluates violations of non-contradiction negatively. I suggest that this evaluation is normative in academia, such that internally inconsistent epistemic policies tend to be untenable in research.

A similar situation arises with the other policy elements. I propose that there are just two stable co-ordinations of the epistemic policy elements so far described:

Science $\langle S+, K_{JTB}, J_{int}, T_{real}, I_{obj} \rangle$

and

Arts $\langle S_o, K_{JB}, J_{int}, T_{non}, I_{subj} \rangle$

These are two the archetypal epistemic policy bundles in academia, somewhat tendentiously labelled here as Science and Arts, following C. P. Snow's (1959) *Two Cultures*. These clusters of policy elements are constrained by the pervasive, and some would argue, hegemonic, commitment to non-contradiction. Diversions from these archetypes are possible, and within the Arts or Sciences a range of policies is still possible (e.g. the "hunch" policy of J_{ext} described earlier). But, when it comes to writing research articles, academia requires explicit justification via the Science bundle for scientists, and the Arts bundle for artists and humanists.

¹⁴ See e.g. Michael Marmura's translation (Avicenna 2005).

Finally, I suggest that Science does not permit scientists to stray very far from the Science bundle. In other words, science disciplines like physics and biology do not recognize *qua* science an epistemic policy bundle including $\langle S- \rangle$, $\langle K_{JB} \rangle$, $\langle T_{non} \rangle$ or $\langle I_{subj} \rangle$. On the other hand, the Arts are more permissive. Many more policy bundles are possible in the Arts, even if ultimately those are generally abandoned for the normative Arts bundle when interrogated at the interface with the hegemonic academy. The characteristics of this epistemologically principled “Two Cultures 2.0” are summarized below:

Science	$\langle S+, K_{JTB}, J_{int}, T_{real}, I_{obj} \rangle$	Narrow EPR
Arts	$\langle S_o, K_{JB}, J_{int}, T_{non}, I_{subj} \rangle$	Wide EPR

1.3 Epistemology and language: Methodological considerations

In this section I foreshadow how the epistemological theory developed so far joins up to the linguistic theory to be reviewed in Chapter 2, and to the empirical analyses of the rest of the thesis. First I discuss the relationship between epistemic policy and the interactional sociolinguistic notion of *stance*. I then compare and contrast this pair of concepts with Goffman’s (e.g. 1974, 1981) notions of *frame* and *footing*. I argue that, though related, epistemic policy and epistemic stance are importantly different from Goffman’s terms. Following this, I suggest some possible links between epistemic policy components and linguistic forms. I then discuss some methodological insights from the nascent field of experimental philosophy that will be of use in Chapters 4 and 5.

1.3.1 Epistemic policy and epistemic Stance (cf. frame and footing)

Goffman's notions of frame and footing have been variously defined in terms of each other,¹⁵ notably by Goffman (1981: 128): 'A change in our footing is another way of talking about a change in our frame for events.' I suggest that the distinction between epistemic policy and epistemic stance parallels that between Goffman's terms, but that the two pairs of terms are not synonymous.

A frame is a way of viewing or interpreting events, including communicative events. Goffman (1974: 48) suggests that members of a society share ideas about frames e.g. make-believe, contests and ceremonies. Framing a fist fight as make-believe, as a boxing match, or as an initiation rite involves seeing the same activity in different ways, and changing the rules and obligations that it connotes. Epistemic policies are similar to frames in that they are perspectives that one can take with respect to an object. Given the description of epistemic policy and policy range above, however, some points of difference become apparent.

Analytically, epistemic policies are composed from low-level objects that are unlikely to have popular currency. Frames on the other hand are high-level objects that are recognized as conventional ways of seeing things. A single epistemic policy bundle makes a range of frames possible. One could see the fight above in all the various ways while keeping one's epistemic policy fixed. Conversely, one could view the fight as make-believe while varying one's epistemic policy, e.g. as either an internalist or an externalist about justification.

¹⁵ See e.g. Ribeiro (2006) or Hale (2011) for an overview.

Goffman's (e.g. 1981) notion of footing seems closer to epistemic stance (see Chapter 2). Footing involves alignment with one's interlocutors, as well as positioning oneself relative to objects of discussion and ways of framing them. Footing is the position one takes up within a frame. The way one then signals that position to others is via the *keying* effect of the linguistic form of the footing. For example, a shift back to "serious" talk from a joke could be achieved by a discourse marker such as *anyway...* The epistemological parallel is that an epistemic policy (or policy range) associates with the taking of particular epistemic stances (positions about the knowledge status of propositions). An epistemic stance then "points to" or *indexes* (see Chapter 2) the epistemic policy of the speaker via the choice of linguistic items that are linked to stance elements, or possibly by their combined effect. Goffman would perhaps not claim that frames and footings are mutually constraining, but merely that keying a change in footing can cause a change in frame. I suggest that a change in epistemic stance is constitutive of epistemic policy, i.e. that linguistic practice creates and maintains epistemic policy. In the next section I foreshadow some of the details of this linguistic construction of epistemological difference.

1.3.2 Possible linguistic correlates of epistemic policy

Below is my initial characterization of epistemological difference in academia, and the possible linguistic correlates of each epistemic policy variant.

Science	$\langle S+, K_{JTB}, J_{int}, T_{real}, I_{obj} \rangle$	Narrow EPR
Arts	$\langle S_o, K_{JB}, J_{int}, T_{non}, I_{subj} \rangle$	Wide EPR

Table 1.2 Possible linguistic correlates of epistemic policy elements

<i>Epistemic policy element</i>	<i>variant</i>	<i>Context of use (Arts / Science)</i>	<i>possible linguistic correlates</i>
Knowledge	JTB	Both	favour weak epistemic modals: <i>may, possibly</i>
	(JB)	Arts?	favour strong epistemic modals: <i>must, certainly</i>
	(B)	<i>untenable?</i>	?
Skepticism	S+	Both	favour weak epistemic verbs: <i>suspect, support</i>
	(S–)	<i>untenable?</i>	disfavour epistemic verbs
	S _o	Arts	favour strong epistemic verbs: <i>know, prove</i>
Justification	J _{int}	Both (“hunches”)	<i>because, since, in view of...</i>
	J _{ext}	Both (Research articles)	?
Investigative	I _{obj}	Science	disfavour 1st person pronoun; favour alethic verbs: <i>show, prove, indicate</i>
	I _{subj}	Arts	favour 1st person pronoun; favour epistemic verbs: <i>believe, argue</i>
Truth	T _{real}	Both	favour singular nouns (e.g. truth, reality)
	T _{non}	Arts	favour plural nouns (e.g. truths, realities)

In Table 1.2 above I have tentatively linked the various forms of the 5 epistemic policy elements to some possible linguistic correlates. This is to give an impression of what is to follow in subsequent chapters, and a more complete list of linguistic variables with epistemic character is given in Chapter 2.

Under the knowledge policy element *K-policy*, I have contrasted K_{JTB} with K_{JB}. K_B is likely to be an untenable position in academic research. K_{JTB} is a more exacting standard of knowledge than K_{JB} since it contains the additional T-criterion. This means that an epistemic policy including a K-policy of K_{JTB} will permit epistemic stances of certainty less often than will epistemic policies with

less stringent definitions of K, e.g. K_{JB} or K_B , where the modals of necessity or certainty may be applied in situations that are not necessary or certain from a classical (JTB) perspective. This could lead to the counter-intuitive situation where disciplines that may be stereotypically viewed as “woolly” or uncertain take seemingly certain epistemic stances to propositions more often than do stereotypically ‘rigorous’ disciplines.

In terms of *S-policy*, it seems logical that denying the possibility of knowledge would negate the possibility of using words such as *know*, although it is possible that semantically bleached uses (e.g. the discourse marker, *you know*) would be impervious to this. However, by the same reasoning as that for K-policy, an Academic skeptical S-policy $\langle S- \rangle$ should effectively loosen the criteria for when epistemic verbs of certainty (e.g. *know*, *prove*, *determine*) may be used—they just would not mean quite the same thing. An epistemist S-policy $\langle S+ \rangle$ however would admit the possibility of knowledge, and, since epistemism is commonly associated with a K-policy JTB, it would reduce the number of propositions to which epistemic verbs of certainty may be applied.

J-policy may associate with differential use of conjunctions like *because* and *since* which are used to explain one piece of discourse by reference to another. Given a policy of internalism about justification $\langle J_{int} \rangle$, it would be more likely for someone to use such conjunctions than if they had a policy of $\langle J_{ext} \rangle$.

I-policy, the policy about placement of the speaker relative to the object of inquiry, seems to semantically overlap the choice of pronoun. The use of pronouns is salient, e.g. when comparing science and arts research articles, and also given received ideas of e.g. how to write up a science experiment (see

Chapter 2). The analogous verbal distinction could be termed *alethic* versus *epistemic*: alethic verbs refer directly to matters of fact, independent of the mind that apprehends them (e.g. *show*, *prove*), while epistemic verbs refer to specifically cognitive relations to matters of fact, i.e. propositional attitudes such as *believe* and *know*.

Non-realism about truth, i.e. a T-policy of $\langle T_{\text{non}} \rangle$ means that epistemic words such as *truth* may be pluralized, while realism about truth would seem to prohibit this. Thus to a non-realist, questions such as “True for whom?” and “According to whose science?” are legitimate, while to a realist about truth, they are nonsensical. Apart from linking truth to social groups, variation in T-policy should manifest linguistically as the singular versus plural distinction for a limited number of lexical items. Epistemological vocabulary seems like a good place to start for candidate loci of variation, e.g. *epistemology/epistemologies*, but opposed pairs of theoretical objects in general are another possibility, such as *masculinity/masculinities* or *subjectivity/subjectivities*.

1.3.3 Measuring epistemic policy: Insights from experimental philosophy

I mentioned above that experimental philosophers have found that people’s intuitions about justificatory internalism and externalism vary (e.g. Weinberg *et al.* 2001). The position that this variation is “a feature not a bug” has been adopted by work under the rubric of experimental philosophy in the past decade. People’s intuitions about epistemological and ethical scenarios have been found to vary according to “irrelevant” factors. For example, according to the order in which a

series of scenarios is presented (for reviews see Knobe and Nichols 2008; Ángel Pinillos 2011; Buckwalter 2012).

Experimental philosophy has proceeded by presenting participants with scenarios like the Gettier cases above, and asking for their judgements. These scenarios are couched in the natural language tradition which assumes that Standard English is being spoken and understood in the same way by all participants. As such, experimental philosophy measures variability in epistemology in a way that is not as valid as it would be if it took account of linguistic variability. This thesis offers a step towards understanding how to do this.

In Table 1.1 above we saw that academics' beliefs and intuitions about the nature of their disciplines can be quite different from what seems to be the case typologically/theoretically in terms of epistemic policy. Academics do not generally conceive of their thinking in terms of an epistemic policy typology, but rather in reference to methodological and practical considerations. This means that one cannot simply ask someone what their epistemic policies are. For this reason, I will make use of experimental philosophical scenarios in categorizing interview participants, although I will also supplement these tools with judgements about the participant based on what they say about matters of epistemological character (see Chapter 4).

1.4 Summary

In this thesis, I investigate the relationship between epistemological variation and sociolinguistic variation. In this chapter, I have reviewed the epistemological concepts necessary to characterize epistemological variation. The model of epistemic policy developed is summarized as follows. An epistemic policy is a bundle of policy elements (as discussed in Section 1.2.1):

1. *K-policy*. This is an analysis of knowledge e.g. JTB
2. *J-policy*. Internalism or externalism about justification
3. *T-policy*. Realism or non-realism about truth
4. *S-policy*. This is a position about skepticism e.g. S+
5. *I-policy*. An investigative position of objectivity or subjectivity
6. *Methods*. Ways of finding things out e.g. experiment, introspection.
7. *Values*. Evaluations and behaviours.
8. *Attitudes*. Beliefs, doubts, desires.
9. *Norms*. Constraints from outside the individual.

An individual will adopt different policies for different purposes. Their epistemic policy range (EPR) may be narrow or wide. I propose that academia only tolerates two basic archetypal epistemic policy bundles for research articles, Arts and Science, and these “Two Cultures” may be classed as having respectively wide and narrow EPR based on how much variability there is among their members.¹⁶

In the next chapter, I review the sociolinguistic research on style and stance, as well as linguistic anthropological work on ideology and indexicality, in

¹⁶ The idea that only a subset of possible policy bundles is stable in academia arose during discussion with the Queen Mary Linguistics department at a postgraduate seminar where I presented an earlier version of these ideas. I have generalized that idea here to the narrow/wide distinction, and identified it with the Science/Arts archetypes.

order to understand how the epistemological distinctions described above are materialized linguistically.

Chapter 2. The Language of Epistemological Difference

As noted in Chapter 1, several distinct research traditions have laid the groundwork for understanding the relationship between epistemological variation and linguistic variation. Having developed a typology of epistemological variation there, I now turn in the present chapter to the linguistic side of this relationship. In Section 2.1, I review two distinct approaches to researching language in society: variationist sociolinguistics and linguistic anthropology. While these schools of thought have not developed in isolation from one another, they are both associated with distinct epistemological assumptions which shape how they theorize and investigate the variable use of language in different social contexts. Both schools develop explanations of stylistic variation that presuppose that speakers have beliefs about their own identity, beliefs about the structure of society, and beliefs about the social effect of linguistic variables. I argue that since beliefs play such an important explanatory role in their theories, it is incumbent on researchers in both subdisciplines to incorporate the role of variable epistemology in their models of linguistic behaviour.

In Section 2.2, I explore how linguistic *styles* can acquire social meaning through the linguistic anthropological notion of *indexicality*. Styles are ways of speaking that have become “noticeable”. They are abstractions made by speakers and analysts, but they are also socially situated objects: they are materialized linguistically through the activities we engage in, and through the *stances* we take to perform those activities. A stance is a position with respect to an object, e.g. an attitude or judgement about it, which can then be expressed linguistically (e.g. *I hate the government*). An *epistemic stance* is a position that you can take towards

the knowledge status of what you are saying, e.g. to convey whether you are certain or doubtful of it, or how you came by the information (e.g. *I thought I saw a pussy cat*). Social groups and communities have characteristic sets of stances, and this means that a stance, linguistically materialized, can be perceived as “sounding like” a community. I argue here that epistemic stance-taking is partly constrained by—and also reproduces—epistemological difference, and that certain forms of epistemic language can therefore come to index a speaker’s epistemic policies.¹⁷

In Section 2.3, I explore how variable epistemology and variable linguistic behaviour interact in the case of Academic English (AE). I use academia as a test population because epistemic commitments there are diverse, and they are also the topic of overt comment. It is an empirical question to what extent the epistemological heterogeneity of academia is typical of other populations, and this will be the subject of future research. I review the research on the interdisciplinary variation in AE in respect of the variables investigated in the remainder of this thesis. In Section 2.4, I summarize the main arguments of the chapter, and I outline how they will be evaluated empirically in the remainder of the thesis.

¹⁷ Recall from Chapter 1 that an epistemic policy is set of attitudes and beliefs that constitute *a way of forming knowledge*.

2.1 Style and belief

‘‘Style’ refers to a way of doing something.’ (Coupland 2007: 1). By analogy with e.g. styles of architecture (Coupland 2007), or styles of dress (Irvine 2001), sociolinguists use the term *style* to refer to ways of speaking. In this section I review the development of the sociolinguistic notion of style, and I explore the relevance of speakers’ beliefs to the various theoretical formulations of style.

In Section 2.1.1, I review the variationist sociolinguistic research on stylistic variation. I show that explanations of stylistic variation in terms of *formality*, *accommodation*, *audience design*, and so on, all presuppose that speakers have beliefs about their own identity, beliefs about the structure of society, and beliefs about the social effect of linguistic variables. I argue that this central role of beliefs compels sociolinguists to take an epistemologically principled approach to style research.

The linguistic anthropological treatment of style is in contrast already explicitly related to speakers’ beliefs, as discussed in Section 2.1.2. I argue that, in both variationist and linguistic anthropological research, the explanatory role of variable beliefs makes a compelling case for incorporating variable epistemology into accounts of stylistic variation.

Stylistics emerged as the linguistic study of style in the first half of the twentieth century; and Sebeok (1960) generalized the study of style from the literary criticism of written texts to include speech (Coupland 2007: 10). Although the emphasis in sociolinguistics since then has been on style as a property of speech, I use the general term *text* throughout this section to include both speech and writing. Both literary criticism and linguistics were at the time undergoing a

self-consciously positivistic turn. By ‘bracketing off’ the content (i.e. referential meaning) of texts and instead focusing analytically on their form and structure, stylistics began to gain momentum as a ‘properly scientific’ enterprise (see e.g. Eagleton 1996: 79–109).

Roman Jakobson was a key theorist and exponent of this *linguistic structuralism*. Prefiguring what would become the field of stylistics, he argued, as Coupland (2007: 10) explains, that ‘poetics (aesthetic response to language and text)... is properly a sub-branch of linguistics’ because it is a general property of all language use, ‘not restricted to poetry and other literary texts’. In other words, Jakobson argued that all texts have an aesthetic dimension (and several more dimensions besides), and that linguistics should therefore be able to account for it. Jakobson’s *poetic function* of a text operates simultaneously with its *referential function*. This means that any text, over and above communicating some referential meaning in virtue of the definitions of its words, also carries an aesthetic or stylistic load: why pick these words and not those?

Coupland (2007: 11) calls Jakobson’s model ‘classically structuralist’ not just for its focus on the formal properties of text, but also due to Jakobson’s exegesis which excessively privileges the interpretive role of the analyst. For Jakobson, the poetic function of a text is fully determined by its linguistic form, and it is therefore unproblematically legible to the sufficiently skilled analyst. This structural determinism was informed Fischer’s (1958) and Labov’s (1966) pioneering quantitative analyses of linguistic variation. Labov’s seminal work is today placed under the classical variationist rubric of *responsive style-shifting* whereby texts are shaped by the social contexts of their production, such as whom

they are being produced for and why (see Section 2.1.1). Rickford and Eckert (2001: 5) contrast this conception of style with that of *initiative style-shifting* whereby texts are viewed as ‘part of a process of construction of identities and social meaning’. Levon (2009: 30) summarizes this process as ‘one through which speakers can constitute and portray personae, identities and various understandings of self.’ In other words, the initiative conception of style-shifting makes room for speaker agency in shaping the form of the texts they produce. This latter approach is heavily influenced by the linguistic anthropological research reviewed in Section 2.1.2.

2.1.1 Classical variationist research on style

Styles—ways of speaking—can be distinguished by the relative frequencies of particular variants of sociolinguistic variables. The idea that speakers change their linguistic style in response to their social context is first articulated in sociolinguistic analysis in Labov’s (1966) work on speech in New York City. In this section I review the subsequent developments in the sociolinguistic analysis of style-shifting as a responsive phenomenon.

Labov (e.g. 1966, 1972) demonstrated that phonetic variables display ‘orderly heterogeneity’.¹⁸ For example, he showed that variable (th)—the initial sound in words like *thunder* and *thorough*—was pronounced as [t] or [θ] not in a random manner, but, rather, in a way that correlates with the socioeconomic class of the speaker. In particular, lower class speakers made more frequent use of the non-standard [t] variant than did speakers of higher social class. Furthermore, he

¹⁸ This term first appears in Weinreich, Labov and Herzog (1968).

found that this phonetic variation correlated not just with social class, but also with what Labov called the degree of *attention paid to speech*. By asking interviewees to read a list of words or a passage of text, he elicited a more “careful”, self-conscious style of speech characterized by less frequent use of non-standard [t]. In contrast, by asking interviewees about their childhood or times when their life was in danger, he elicited a more “natural”, uninhibited style of speech characterized by more frequent use of non-standard [t]. In other words, by drawing speakers’ attention to their own speech, Labov encouraged them to shift to a more standard or “formal” speech style; and by drawing their attention away from their own speech, he could elicit a more “casual” style.

Individual speakers, then, had been shown to have a range of linguistic styles at their disposal, characterized by different frequencies of phonetic variants. Labov (e.g. 1972, 2001b) showed that an individual’s stylistic repertoire can be ordered on a dimension of attention paid to speech. The most self-conscious speech situations produce the lowest frequencies of non-standard phonetic variants, corresponding to the most formal speech style.

Labov (2001b: 87) points out that his notion of attention paid to speech was intended more as an analytic tool than as an explanation for style-shifting. However, the fact that the same linguistic variables that exhibit social stratification had been found to also exhibit stylistic variation was remarkable. It was as if every speaker had a mental model of the class structure of society, including how members of each class are supposed to sound, and was then adjusting their own use of linguistic variables “up or down the class system” to sound more or less formal as the situation required. As Labov summarized it,

‘each group models its formal style on the speech behaviour of those groups one or two steps above it on the social scale’ (Labov 1969: 23–24). This explanation requires that speakers hold a number of beliefs:

1. Society is divided into n classes.
2. I am of social class x .
3. The frequency of linguistic variants [a], [b], [c], etc., increases from social class 1 up to social class n .
4. Reading a list of words from a page is a very formal situation.
5. More formal situations require me to sound more formal.
6. To sound more formal, I should adjust my frequency of use of linguistic variants [a], [b], [c], etc. towards that of social class $x+1$ or $x+2$.

(Analysis based on Labov 1969)

Beliefs 1 and 2 are likely to be *declarative* beliefs for many people: things they will explicitly state from time to time (though see e.g. Milroy 1980; Rickford 1986 for criticisms of this assumption). Beliefs 3 to 6 are more likely to be implicit or *procedural* beliefs, which is to say that speakers are in general unlikely or unable to formulate them explicitly. Belief 4 is specific to Labov’s methodology in which he operationalizes formality as attention paid to speech (which he varies by manipulating the type of speech event).¹⁹ Belief 5 is specific to models of style-shifting which are responsive (although they may link that response to elements of the context other than its formality). Belief 6 contains the link between the formality dimension (formal—informal) and the social class

¹⁹ Belief 4 could be couched in more general (and more Labovian) terms as ‘Formality tracks attention paid to speech.’

dimension (upper—lower) of linguistic variation. This link is directional: socially stratified linguistic variation is “borrowed” to “do formality”; it is not Labov’s contention that linguistic variation by class emerges from linguistic variation by formality.

Beliefs, then, whether declarative or procedural, are a necessary component of Labov’s account of responsive style-shifting. But not everyone holds the same beliefs. Labov (1972) observed that lower middle class (LMC) speakers “overshoot” the upper middle class (UMC) level of the standard variant of (r) when reading word lists: LMC speakers were sounding more upper class than UMC speakers. This phenomenon of *hypercorrection* suggests that the LMC speakers differ from all other speakers (at least quantitatively, and perhaps qualitatively) in respect of 1 of the 6 beliefs listed above, and potentially all of them.

Labov’s work was seminal in the sociolinguistic study of style-shifting. I now review its theoretical germinations within the structuralist sociolinguistic conception of responsive style-shifting. As Coupland (2007: 58) points out, a notable omission in Labov’s model is the notion of *recipency*. Texts are produced for someone—and subsequent theories of style-shifting incorporated this collaborative dimension of style-shifting. Sacks, Schegloff and Jefferson (1974: 727) introduced the term *recipient design* to refer to ‘a multitude of respects in which the talk by a party in a conversation is constructed or designed in ways which display an orientation and sensitivity to the particular other(s) who are the co-participants’. Those authors construe this process to operate at the level of word choice, and also at higher levels of text such as topic selection and the

organization of turn-taking. Recipient design need not be a conscious process, but the effect of it is to produce texts which appear designed or suited to their recipient by virtue of the linguistic variants they feature. This explanation of responsive style-shifting requires that speakers hold a greatly expanded set of beliefs compared to those required in Labov's model. Three additional classes of belief are required:²⁰ beliefs about how to 'display... orientation and sensitivity', beliefs about what effect different linguistic variables have in interaction (not just phonetic variables, but at variables at various linguistic levels), and beliefs about which 'particular other(s)' one is talking to.

The recipient design model allows for even greater variability among speakers than the attention-paid-to-speech model in terms of the beliefs that they rely on to shape their responsive style-shifting. The picture is further complicated by the notion of *accommodation* (Giles 1973; Giles and Powesland 1975) whereby speakers *converge* towards or *diverge* from the speech style of their listener. The explanations for convergent and divergent accommodation derive from the origins of these notions in the discipline of social psychology. Convergent accommodation is used by speakers aiming to 'win approval' (Schilling-Estes 2002: 383) or 'seeking social attractiveness' (Coupland 2007: 62), while divergent accommodation is used to create or maintain 'psychological distance' (Schilling-Estes) or 'reduce intimacy' (Coupland). The role of speakers' beliefs is even more obvious in this social psychological model of style-shifting. Giles (2001: 211) refers to 'ways in which individuals define situations in their minds' eye', and he regards perceived formality as just one among many

²⁰ I say 'additional' because the recipient design model of responsive style-shifting is compatible with the attention-paid-to-speech model: both could simultaneously contribute to the production of a style.

dimensions along which ‘speaker-hearers carve up contexts psychologically and subjectively’. How these dimensions are conceived of, and responded to, in interaction depends importantly on what one believes about oneself, one’s interlocutors, society, and the role of language in orienting to and positioning oneself with respect to these constructs.

Bell’s (1984) audience design framework is a standard reference point in the sociolinguistics of style which integrates quantitative variationist research findings with a more elaborated model of recipient design, and makes a number of programmatic hypotheses. Bell reviews a range of sociolinguistic data on style-shifting to support the strong claim that, whereas linguistic variation between speakers is due to their variable demographic characteristics (sex, age, class, etc), stylistic variation within the speech of a single speaker is due to the influence of their audience. Bell’s definition of audience includes not just the addressee, but also the third persons whose influence on speaker style depends on their salience for the speaker. The addressee has the most salience, being often physically closest, known to be present, “ratified” and directly addressed. Other audience members are of lesser salience: *auditors* are known and ratified, but not directly addressed; and *overhearers* are known but not ratified. *Eavesdroppers* have no salience for the speaker because they are unknown, and hence cannot affect speaker style.

Bell also introduces the notion of the *referee* which, like the eavesdropper, is a person not physically present, but who ‘hold[s] an umpiring role in the speaker’s consciousness’ (1984: 161). In other words, Bell argues that style-shifting occurs in response to an audience some members of which may not even

be known to be there, but which the speaker orients towards as ‘an ideal or absent reference group’ (1984: 172). Furthermore, he argues that style-shifting in response to topic and setting derive from audience-designed shift. ‘That is, speakers associate classes of topics or settings with classes of persons. They therefore shift style when talking on those topics or in those settings as if they were talking to addressees whom they associate with the topic or setting.’ (1984: 181).

Bell’s notions of audience and referee design further expand the set of beliefs required of speakers in order to instantiate his more articulated model. Furthermore, Bell’s style axiom makes explicit what is implicit in theories of responsive style-shifting from Labov onwards:

Variation on the style dimension within the speech of a single speaker derives from and echoes the variation which exists between speakers on the “social” dimension.

(Bell 1984: 151)

In other words, Bell’s style axiom asserts that speakers draw their stylistic repertoire from the demographically stratified linguistic variation in society. He argues that this accounts for the repeated empirical finding that speakers style-shift to a degree that is smaller than the range of variability in society.²¹ Drawing on Labov’s categories of variables, he argues that style-shifting requires social

²¹ Bell notes two exceptions to his axiom (1984: 156–58). First, *hypercorrection*, in which a speaker overshoots their target, can lead to an individual shifting to a degree larger than the “normal” variability across all social classes. Secondly, *hyperstyle*, in which the shift from free speech to reading produces a very dramatic style shift, results from the role of literacy and oracy in particular communities: ‘In [these societies...] reading is a separate dimension of language behaviour from free speech. The result is a radical switch rather than a gradient style shift.’ (1984: 156).

stratification, whereas social stratification does not require style-shifting. Labov's (1972: 314) *indicators* are linguistic variables that are stratified by social categories, but which are not subject to evaluation. *Markers* on the other hand are stratified socially and are also subject to unconscious evaluative reactions (e.g. hearers will judge speech less favourably if it contains more low-prestige markers). It is evaluation by speakers, Bell argues, that allows markers to become available as stylistic variables: their social use—and users—are judged, and that is what gives them their meaning-in-style.

2.1.2 Linguistic anthropological research on style

Styles are ways of speaking or writing. There are no language uses that are free of style. Styles are distinguished from one another by their particular ensemble of linguistic features. 'Reading the meaning of a style is inherently a contrastive exercise.' (Coupland 2007: 1). Irvine (2001) goes so far as to reduce style to this most basic structuralist opposition in her essay entitled "'Style" as distinctiveness' (my emphasis). Section 2.1.1 reviewed the development of the study of style within variationist sociolinguistics, where that structural basis, though foundational, was regarded as unproblematic. Variationist studies presupposed that linguistic variables exist, and that they come in more than one flavour (variant), and that different variants carry information about social class or other social variables. The linguistic anthropological approach is to ask how this can be so: why and how do variants acquire their social meaning?

Bell (1984: 182–86) introduces the notion of *initiative style-shifting*, whereby a speaker 'takes the initiative and redefines the situation through speech',

however he argues that initiative style-shifting is ‘still responding to the audience’, albeit responding in a manner that ‘[redefines...] the relationship between speaker and addressee’. He cites an example from Coupland (1980) of a travel assistant who accommodates towards a customer to appear more helpful, but then diverges from them to appear authoritative. For Bell (1984, though cf. 2001) the travel assistant is still mechanistically responding to the presence, both real and imagined, of other people. In this section I review a research tradition that emerged concurrently with Bell’s (1984) paper, but which conceives of style-shifting in a radically different way. This approach may be called *linguistic constructionism* because it is a “language first” model of variation whereby our social world and its categories are constituted by our use of language. The implication of this is, *contra* Bell’s style axiom, that stylistic variation within speakers gives rise to sociolinguistic variation between speakers. In fact these two oppositely directed explanatory models—one deriving individual linguistic variation from socially stratified linguistic variation, and one deriving the social stratification from the aggregate of individual behaviours—are not necessarily mutually exclusive. Recent work in the sociolinguistics of style has self-consciously moved from an “either/or” to a “both/and” model (Rickford and Eckert 2001; Levon 2009), thanks in large part to the input of linguistic anthropology. In the rest of this section I review the linguistic anthropological theories of *social semiosis*²² that have informed these recent developments in

²² This is a very broad term which is used with different emphases in diverse fields including information science, sociobiology, ethology, ethnology, sociology, literary criticism, and philosophy of language. *Semiosis* refers to the study of signs, i.e. symbolic forms that carry meaning by ‘standing for’ some referent. *Social semiosis* refers to the processes by which signs are made and used in *social* processes such as in interactions between conversants, or within institutions or cultures.

variationist sociolinguistics. I show that, as was the case for the structuralist-variationist accounts of style reviewed in Section 2.1.1, the role of beliefs, and hence of epistemology, is of central importance to linguistic anthropological theories of semiosis, and therefore of central importance to the recent sociolinguistic theories of style which incorporate them. Hence I argue for an approach to the sociolinguistics of style which is grounded in a systematic approach to epistemological variation as outlined in Section 2.2.

The linguistic constructionist turn in the sociolinguistic study of style is often linked to Le Page and Tabouret-Keller's (1985) seminal *Acts of identity*.²³ This model of stylistic variation 'emphasizes the role of the individual as a creative agent' (Rickford 2011: 254). Rather than framing style-shifting as a mechanistic response to situational variables, Le Page and Tabouret-Keller (1985) suggest that

The individual creates for himself the patterns of his linguistic behaviour so as to resemble those of the group or groups with which from time to time he wishes to be identified, or so as to be unlike those from whom he wishes to be distinguished.

(Le Page and Tabouret-Keller 1985: 181)

Rather than *having* static identities that are fixed by demographic category membership, then, speakers *construct* their identities dynamically in on-going talk. Identity as a linguistic construct is thus a radically destabilized identity in stark contrast to the assumed near-permanence of sociodemographic group membership. Many theorists—and people in general—find this a troubling

²³ Developed from Le Page *et al.* (1974).

conception since it appears to undermine the use of social categories altogether. One resolution is to carry on using categories “strategically” in sociolinguistic analysis, but to avoid reifying them by making overly-strong ontological claims about social reality. For example, we can use the categories of upper middle class and middle middle class in order to describe differentiation in linguistic behaviour, but we cannot then infer the existence of those class divisions from this as a matter of social fact. Of course, this notion of *strategic essentialism* (Spivak 1988: 205) is available not just to researchers, but to all social actors, as will be explored further below. Le Page and Tabouret-Keller (1985) did not adopt strategic essentialism in their analysis, and Le Page elsewhere explicitly argues against assuming categories, as discussed by Rickford:

The idea was “to cluster the children according to similarities in their [linguistic] behavior,” and THEN look for significant correlations between the linguistic clusters and “various cultural and socioeconomic indices” of the children and their families (McEntegart and Le Page 1982: 106). The authors’ decision to approach the analysis in this way, rather than beginning with the social categories was explicitly justified as follows:

The decision to avoid the procedure followed by Labov (1966, 1972[a]) Trudgill (1974b) and G. Sankoff (1974) of dividing the population according to pre-established socio-economic categories and then sampling each category, was taken for several reasons. In the first place, such a procedure precludes discovering anything about the emergent social structure other than in terms of these ‘imported’ and pre-set categories; in the second place, we did not feel we knew enough about the cultural and economic and ethnic stratification of the two societies to arrange our sample in this way; in the third place, it was part of our aim to discover what social mechanisms were at work, what groups were emerging according to the linguistic symptoms, rather than vice versa.

(Rickford 2011: 255)

The idea that social categories are mutable, and that we are free to perform our way into and out of membership of them seems to offer a mechanism of totally levelling society by making all social categories equally available to all speakers. However, Le Page and Tabouret-Keller (1985: 182) suggest some limits on the performative potential of speakers:

We can only behave according to the behavioral patterns of groups we find it desirable to identify with to the extent that:

- i. we can identify the groups
- ii. we have both adequate access to the groups and ability to analyze their behavioral patterns
- iii. the motivation to join the groups is sufficiently powerful, and is either reinforced or reversed by feedback from the groups
- iv. we have the ability to modify our behavior.

(Le Page and Tabouret-Keller 1985: 182)

These processes all presuppose beliefs of the same kind as those required in Labov's model of style-shifting, and they also supplement them with social psychological details about the limits of perception, experience and performance.

Eckert (2000) reformulates social categories in terms of social practice: what do people do that causes them to be perceived as a group? This provided a more valid form of strategic essentialism, since the analytic categories are "locally salient", i.e. they are referred to by the speakers themselves. Eckert's notion of a *community of practice* developed from that of Lave and Wenger (1991) and Wenger (1998), and it is explained on her website via a composite of definitions from her independent work (2000) and in collaboration (Eckert and McConnell-Ginet 1992, 2003):

A community of practice is an aggregate of people who come together around mutual engagement in some common endeavor. Ways of doing things, ways of talking, beliefs, values, power relations - in short, practices - emerge in the course of their joint activity around that endeavor. A community of practice is different as a social construct from the traditional notion of community, primarily because it is defined simultaneously by its membership and by the practice in which that membership engages. And this practice involves the construction of a shared orientation to the world around them - a tacit definition of themselves in relation to each other, and in relation to other communities of practice. The individual constructs an identity - a sense of place in the social world - through participation in a variety of communities of practice, and in forms of participation in each of those communities. And key to this entire process of construction is stylistic practice.

(Eckert [n.d.])

Le Page and Tabouret-Keller (1985) referred to 'groups' that speakers pick out and whose characteristics they emulate. Eckert's (2000) argument, then, is that these groups are locally salient communities of practice. She says that communities of practice have a 'shared orientation to the world', by which she means that their members have a consensual understanding of their group in relation to others (Eckert [n.d.]). The communities of practice model thus builds in a number of ways on the presupposed beliefs about self and social position common to all models of style-shifting. First, Eckert emphasizes that these beliefs are a matter of consensus, and that it is that very consensus which defines group membership. Not only do group members share beliefs, but their 'shared orientation to the world' (Eckert [n.d.]) also sounds very much like the notion of epistemic policy discussed in Chapter 1. In other words, it is possible to read this 'orientation to the world' as comprising not only beliefs about what social

structures exist and where one fits in among them, but also beliefs—or policies—about how to evaluate one's experience of social groups and their characteristic forms of talk.

An individual participates in various communities of practice and commands the language styles associated with the activities of those communities. Then, by selectively deploying stylistic features emblematic of communities of practice, an individual constructs an identity. This process of *bricolage* (Hebdige 1979: 102–06; originally from Lévi-Strauss 1966) may be above or below the conscious awareness of the speaker. Coupland (2001) uses the term *stylization* for the self-conscious use of stylistic features for effect. Stylization may involve extrapolating linguistic variants beyond what is present in society (cf. hyperstyle and hypercorrection discussed above). Stylization has a greater potential than “unconscious” style-shifting to be construed as parody; the “conscious” appropriation and/or exaggeration of linguistic forms therefore also raises questions of authenticity (see e.g. Rampton 2005). In other words, the potential for a style-shift to be construed as somehow deliberate makes the speaker culpable should they overreach their “natural” identity boundaries, e.g. by taking on the accent of a different ethnic group. On the other hand, Schilling-Estes (2004: 164) views identity itself as emergent-in-interaction via ‘the interplay between reified structures and speaker agency’. This means that, while “natural” boundaries of identity are a result of linguistic performances being circumscribed by individuals’ beliefs about what social categories exist and which ones they belong to, *crossing* (Rampton 2005) into incongruous stylistic territory reconfigures one's identity through an expanded stylistic repertoire, rendering the notions of

authenticity and appropriation far less transparently applicable analytically, if not for the speakers themselves.

A *discourse community*, as defined by Swales (1990) is a larger social unit that has been used to characterize academic disciplines. Swales gives the following criteria for identifying a discourse community:

1. has a broadly agreed set of common public goals
2. has mechanisms of intercommunication among its members
3. uses its participatory mechanisms primarily to provide information and feedback
4. utilizes... one or more genres in the communicative furtherance of its aims
5. has acquired some specific lexis.
6. has a threshold level of members with a suitable degree of relevant content and discursual expertise

(Swales 1990: 24–27)

Given these criteria, one could interpret the notion of community of practice as a special case of a discourse community where members come together in mutual engagement. Discourse communities on the other hand can be spatially and temporally diffuse, and their communicative channels are therefore more likely to be textual, such as academic journals and email. Some academic genres, such as lectures, conference presentations and department meetings do involve mutual engagement by co-present individuals. I suggest, therefore, that while an academic discipline in its broadest construal may be described as a discourse community, it is also a composite of multiple communities of practice. Furthermore, I suggest that the ‘common endeavour’ and ‘shared orientation’ of the community of practice are more homogeneous within a single community of practice than are the ‘broadly agreed’ ‘common public goals’ of the discourse community.

What are these common endeavours, orientations and goals? I suggest that they are epistemic policies. Rather than treating disciplines as qualitatively different, then, the concept of epistemic policy, and in particular epistemic policy range (EPR), offers a description of academia as a single discursive universe within which regions differentiate themselves by selecting particular epistemic policies from a common pool of epistemological elements. Disciplines can therefore be placed on a continuum from narrow to wide EPR, depending on how diverse their component communities of practice are. These epistemic policies are performed linguistically: mainly through talk at the level of community of practice, and through text at the level of discourse community. In this thesis, I explore those more diffuse commonalities in academic practice that are captured by the notion of discourse community. Future work is required at the level of the discourse community to look quantitatively at the intersubjective dimensions of epistemic stance construction.

2.2 Indexicality, style and stance

We saw in Section 2.1 that styles are distinguished by the relative frequencies of particular variants of sociolinguistic variables. Since Labov's classification of styles in terms of formality, sociolinguists have asked how much explanatory power the level of attention paid to speech can have with respect to style-shifting, and, finding it wanting, they have proposed several alternative explanations in terms of reciprocity, identity and participation. What these explanations all have in common is that they claim that style-shifting depends on what speakers believe

about themselves and about who hears them. This theoretical shift has been associated with a move away from more positivistic, deterministic, individualistic models towards more constructionist, agentive, intersubjective models. In the terms of these latter trends, when speakers shift their style of speech, they display an “adjusted” version of themselves that “sounds like” some imagined persona that they wish, whether consciously or not, to project. By performing a persona in this way, and hence sounding more (or less) similar to others, speakers are able to position themselves relative to their interlocutors (whether real or imagined) and relative to social structures generally.

This treatment of style-shifting assumes that the ‘orderly heterogeneity’ (Weinreich *et al.* 1968) of sociolinguistic variables is not static, i.e. that it is not the case that social categories such as gender or ethnicity determine the probability of using one variant over another. Rather, patterns of linguistic variation reflect dynamic equilibria²⁴ characterized by, as Bucholtz puts it, ‘subtler and more fleeting interactional moves through which speakers take stances, create alignments, and construct personas’ (2009: 146). In other words, speakers actively deploy linguistic variants to perform social actions. But this is only possible because linguistic variants have social meanings with a greater degree of stability than the identities which they are deployed to construct: without some stability in social meaning, it would not be possible to interpret a performed persona. On the other hand, it is the very property of

²⁴ The metaphor of the dynamic equilibrium comes from chemistry. It describes a situation where the macroscopic properties of a system (e.g. the relative concentrations of two compounds in a solution) are stable, while at the molecular level, that stability is constantly being undermined and reinforced by chemical reactions (e.g. by the interconversion of two compounds).

underdetermination in social meaning which allows for the agentive construction of novel personae:

whenever speakers (or writers) say anything, they encode their point of view towards it [...] The expression of such speakers' attitudes is pervasive in all uses of language. All sentences encode such a point of view, [...] and the description of the markers of such points of view and their meanings should therefore be a central topic for linguistics.

(Stubbs 1986: 1)

Stubbs refers here to sentences as *speech acts* (Austin 1962; Searle 1969). All utterances can be interpreted as performing speech acts such as promising, conjecturing or asserting, even if not made explicit e.g. with *performative verbs* as in *I promise...*, *I hereby bequeath...*, etc. (see e.g. Searle and Vanderveken 1985: 1–12). However, it is also possible to read Stubbs' quote from a structuralist perspective such that all sentences stand in relation to sentences that have gone before and to alternative potential sentences that were not in fact, or have yet to be, realized. Resonances are thus set up that imbue each newly uttered sentence with additional layers of meaning (cf. Bakhtin 1981; Vološinov 1986). Jaffe (2009: 3) notes the consequence of this that 'there is no such thing as a completely neutral position vis-à-vis one's linguistic productions, because neutrality is itself a stance.'

This idea that meaning is "always already" partly determined is usually attributed to Heidegger (e.g. 1971), and this phrase is now a widespread trope in post-structuralist research. Post-structuralism is widely credited with challenging binary oppositions in general for their hegemonic nature, and Derrida (1976)

applies this challenge to the central tenet of structural linguistics: difference as the source of linguistic value. However, the idea that (linguistic) styles have social significance only in opposition to other styles relies crucially on precisely this notion of structural binarity, even though its theoretical proponents are normally highly critical of socio-political binarity. While there is a potential for strategic essentialism in analysis to reify—or at least to (appear to) ratify—categories that perpetuate hegemonic power structures beyond academia, a theory of social semiosis based on difference/distinction need only suggest that speakers conceive of styles in opposition to other styles; doing so analytically is then a descriptive rather than a normative position.²⁵

Peirce's (1906: see Peirce 1958) analytic opposition between *token* and *type* is also widely used to distinguish between instances of linguistic signs on the one hand, and the varieties of sign on the other. For example, in the last sentence, there were three prepositional tokens (one occurrence of *between*, and two of *on*); but there were only two separate types of preposition (*between* and *on*). The type-token distinction is very widely used in linguistics, but it too has been criticised by post-structuralists among others (cf. also Halliday's 2003 *cline of instantiation*).²⁶ In the rest of this section, I first explore how ways of speaking may become (gradualistically) reified into social categories via the repeated *taking of stance* (Section 2.2.1). In Section 2.2.2, I discuss the distinction between epistemic and affective stances. I then discuss how stances point to or *index* social categories in Section 2.2.3.

²⁵ This raises the possibility of speakers who are such committed post-structuralists that they fail to notice stylistic variation, or at least refuse to attribute stylistic variation to social categories.

²⁶ The third element of Peirce's trichotomy—the *tone*—has not gone into widespread use.

2.2.1 Style and stance

In the discussion of theories of style above, I highlighted some common assumptions. First, speakers need to become aware of groups. This could mean demographic categories such as classes or genders, or local communities of practice. Next, speakers need to associate these groups to styles of speech. Both these steps require that speakers perceive differentness, i.e. that they distinguish between themselves and others in both social and linguistic dimensions. In this section, I discuss the nature of this association between the social and the linguistic. Ochs (1992) argues that this association is not direct, but mediated by *stance*. But what is a stance?²⁷

Biber and Finegan (1989: 92) provide a broad definition of stance as ‘the lexical and grammatical expression of attitudes, feelings, judgements, or commitment concerning the propositional content of a message’. The focus on how stance is linguistically instantiated is particular to linguistics. The philosophical conception of stance as discussed in Chapter 1 is more like the second half of Biber and Finegan’s definition: just the state of having the attitudes, feelings, judgements or commitment to propositions.²⁸ The linguistic study of stance associates an often implicit, intuitive version of the philosophical notion of stance within various linguistic phenomena such as the use of modal verbs or evaluative language, and refers to that linguistic instantiation as stance.

²⁷ Ochs (1992: 342f) also discusses *acts* and *activities* as mediators of socio-linguistic linkage. These notions are more relevant to a rich ethnographic description of academia, rather than to the more abstract treatment of epistemological commitments in academia that I attempt here.

²⁸ Propositions are those components of sentences that can take a truth value. *It’s hot today* and *Is it hot today?* both contain the same propositional content *that it is hot today*. Roughly speaking, the propositional content of a message is what the message is about. Propositions are discussed more fully in Chapter 4 where they form the basis of my segmentation of textual data into tokens.

From the linguistic constructionist perspectives discussed above in the present chapter (Section 2.1.2), it is possible to conceive of stances not as attitudes etc. that individuals “have”, but rather as attitudes etc. that speakers construct or perform through talk-in-interaction. In short, stance not only conveys attitudes etc. about the propositions contained in their message, but also about the recipient of the message. Furthermore, stances are partly shaped by recipients. This intersubjective dimension of *stance-taking* is spelled out in Du Bois’s definition: ‘Stance is a public act by a social actor, achieved dialogically through overt communicative means, of simultaneously evaluating objects, positioning subjects (self and others), and aligning with other subjects, with respect to any salient dimension of the sociocultural field.’ (2007: 163). In other words, we co-construct positions in respect of our utterances through linguistic interaction; and those positions not only indicate how we evaluate what we say, but they also indicate how we think our position fits into various social institutions and demographic categories.²⁹

²⁹ Du Bois summarizes his ‘stance triangle’ as ‘I evaluate something, and thereby position myself, and thereby align with you.’ (2007: 163).

2.2.2 Epistemic stance

Gray and Biber (2012) review the diverse conceptions of stance in linguistic research, and they find that ‘the expression of stance varies along two major parameters:

- | | |
|---|---|
| (1) meaning of the assessment: | personal feeling/attitude ↔ status of knowledge |
| (2) linguistic level used for assessment: | lexical ↔ grammatical’ |

(Gray and Biber 2012: 15)

Gray and Biber (2012) do not consider the intersubjective nature of stance. Their first parameter distinguishes between affective and epistemic stance, a division which Ochs (1996) summarizes as follows:

Affective stance refers to a mood, attitude, feeling and disposition, as well as degrees of emotional intensity vis-à-vis some focus of concern (Ochs & Schieffelin 1984, Labov 1984, Levy 1984);

Epistemic stance refers to knowledge or belief vis-à-vis some focus of concern, including degrees of certainty of knowledge, degrees of commitment to truth of propositions, and sources of knowledge, among other epistemic qualities (Chafe & Nichols 1986).

(Ochs 1996: 410)

Gray and Biber’s representation of the meaning parameter with a double-headed arrow hints at the possibility that these two categories are not distinct, and that stance may in general convey epistemic and affective information. This reading is consistent with the linguistic constructionist perspective of stance: even a neutral

stance is “doing neutrality”. There is also cross-linguistic support for functional overlap in these categories (see e.g. Cook 2011: 297). The present thesis is focused towards the epistemic end of the spectrum, i.e. linguistic phenomena that explicitly refer to epistemic matters of the type discussed in the last chapter, such as what type of knowledge is being expressed, how it was found out, and how certain the speaker is of it.

Gray and Biber’s second parameter of linguistic level is also symbolized with a double-headed arrow, which again can be interpreted to mean that explicit linguistic expression at one level (e.g. lexical) simultaneously implies expression at another (e.g. modal).

- (2) a. Are you joking?
 b. You’re joking.
 c. You must be joking.
 d. I can tell you’re joking.
 e. Clearly you’re joking.

All these examples express the same main proposition *p* (*that you’re joking*) but they differ in several respects. In terms of speech acts, Example (2a) is a question and the others are declaratives. Examples (2a) and (2b) differ *syntagmatically*, i.e. in their word order, and probably also prosodically (e.g. with rising intonation for the question). Examples (2a–b) all vary *paradigmatically*, i.e. in the substitution of certain elements for others ($\emptyset \sim \text{must} \sim \text{I can tell} \sim \text{clearly}$), although Example (2c) includes the modal verb *must*, which also causes the matrix verb to be realized as *be* rather than *is*. Examples (2c–e) all convey a heightened sense of certainty compared with Example (2b). Example (2d) subordinates the matrix clause (containing *p*) to another clause containing (albeit rather vague) information about

how the speaker came to know the propositional content (*I can tell*). Example (2e) does the same job with the adverbial *clearly*. All these examples are in structural opposition to the others (and all possible others). Examples like (2b) are sometimes called “bald” expressions since they are minimal in the relevant sense, but, as we saw in the earlier discussion of stance, neutrality (or baldness) is itself a stance. Choices at one linguistic level, then, always evoke their potential alternatives at that same level. The presence of one item may make the presence of a second more or less likely, e.g. *Clearly you must be joking* could be read as a comment on the apparentness of the inferential basis of the inference that *p*, rather than a comment on the apparentness of *p* itself as in Examples (2c) and (2e). Furthermore, linguistic choices at one level always occur in concert with other levels. Given appropriate prosody, and an appropriate interactional context, Examples (2a–e) could sound dismissive or convivial, sarcastic or sincere, confident or anxious. The present thesis examines a range of lexico-grammatical variables in Chapters 3 and 4.

The term *evidentiality* was popularized by Chafe and Nichols (1986: 271), who used it in two senses. In the narrow sense, it is the linguistic marking of the source of knowledge, while in the broad sense it marks the speaker’s ‘attitudes towards knowledge’ in a number of dimensions:

1. Reliability of knowledge.
2. Source of knowledge.
3. Manner in which knowledge was acquired (justification).
4. Appropriateness: match between language and evidential meaning, and match with reader/hearer expectation.

(Adapted from Gray and Biber 2012: 16)

Clift (2006: 570) notes that the above notion of linguistic stance emerged from the study of narrow evidentiality: the obligatory marking of information source—‘whether seen, heard or inferred’ (Boas 1938: 133). Although widespread in the world’s languages, English lacks such an obligatory morphological system, relying instead on optional and morphosyntactically diverse evidential marking (see e.g. Aikenvald 2004 for a typological review of evidentiality in the narrow sense). Peterson, Déchaine and Sauerland (2010) illustrate obligatory evidentiality using the nearest equivalents from English: adverbs (such as *reportedly*, *actually*), modals (such as *must* which can imply inference) and verbs (e.g. *It looks like...*, or *I hear that...*).

Aikenvald (2004: 4–5) makes the provocative claim that narrow evidentiality is related to (very) narrow epistemology, and that any attempt to relate it to the kind of socialized epistemology discussed in Chapter 1 ‘[results] in conceptual and terminological confusion’:

Linguistic evidentiality has nothing to do with providing proof in court or in argument, or indicating what is true and what is not, or indicating one’s belief. All evidentiality does is supply the information source.

(Aikenvald 2004: 5)

It is clear however that supplying the information source requires one to believe, and indicate, at least one thing about the information source, namely, what it is. Aikenvald notes in the same volume that, where multiple sources of information are present, one has to choose which one to encode in one’s speech, perhaps

according to some hierarchy of preference.³⁰ ‘Alternatively, a particular narrative genre may require a certain evidential. An unconventional and unexpected evidential is likely to produce an unusual effect’ (2004: 305, 310–24). The idea that there could be conventional means of indicating the source of knowledge is a social epistemological commitment. Aikenvald says that choosing an evidential marker that departs from convention will be odd in some way. This indeed points to an intimate relationship between social epistemology and evidentiality in the narrow sense. I argue here that the same kind of relationship obtains for evidentiality in the wide sense, including for example, (after Biber *et al.* 1999: 972) epistemic modality (*must, may*), actuality (*actually, in fact*), (im)precision (*kind of, like*) and generalization (*typically, generally*).³¹

Also not addressed in the narrow conception of evidentiality is the linguistic constructionist notion that its meaning is underdetermined, and that its meaning-in-interaction is dependent on its intersubjective use in the construction of stance. Agha (2007: 86) makes a similar distinction between the *denotation of expressions* (i.e. their dictionary meaning) and *acts of referring*: ‘communicative events anchored to participation frameworks, namely to configurations of persons in roles such as sender and receiver of message.’

³⁰ A language like Central Pomo has a five-way distinction in verbal suffixes for marking information source including information acquired by visual or inferential means, but also general knowledge (Aikenvald 2004: 61). Part of learning how to speak Central Pomo would seem to consist in acquiring the cultural norms about what propositional content can be assumed to be general knowledge, and what requires a more explicit justificatory history.

³¹ Mushin (2001: 58–79) makes a similar argument that various stances (she suggests e.g. experiential, inferential, reportative, factual and imaginative) are universally available (‘speakers of all languages have the ability to represent them as part of their construal of states of affairs’), but that the ‘contexts in which these stances are actually adopted is predicted to vary significantly cross-linguistically.’ I would change ‘cross-linguistically’ to ‘cross-culturally’ or ‘depending on epistemic policy’.

Kärkkäinen (2003: 23–24) notes this issue with regard to stance adverbials in her review of Biber and Finegan’s research: ‘They point out (1988: 1, 30) that the discourse functions of stance adverbials often differ considerably from their literal meanings, and also observe (1989: 110) that in conversation certainty and doubt are sometimes expressed side by side, which they take to indicate that the focus is on involved interaction rather than precise semantic expression.’

Some authors talk about *epistemic stance*, and others about *epistemological stance*. Mushin construes epistemic stance broadly, and calls it epistemological stance:

When verbally representing a piece of knowledge, speakers necessarily take a stand on how they acquired the information, how they know it. This stand is their epistemological stance towards the information. Epistemological stance is thus a part of the construal of information, operating in conjunction with other necessary parts [...] As a conceptual structure, epistemological stance is independent of linguistic form and may be expressed by any of grammatical, lexical or paraphrastic means.

(Mushin 2001: 52–53)

By emphasizing the independence of broad epistemic stance and linguistic form, Mushin takes a strong position against the linguistic construction of epistemic stance. For her, epistemic stance exists first, and its expression in language is a matter of choice.

Barton (1993: 746) defines epistemological stance as ‘the underlying perspective on knowledge represented in a text’. This definition is different from that of Mushin, and it equates to the idea of epistemic policy developed in Chapter 1 as represented in a text. Similarly, Duranti equates epistemological stance to the

theoretical orientation towards a research object (in this case a constructionist approach to language) in his discussion of Hymes' (1972: 277–78) criticism of Chomsky's conception of competence: 'This means that speaking is seen above all as a social activity involving always more than linguistic expressions. This epistemological stance [...]' (Duranti 1997: 20).

Having now clarified stance, and its particularly epistemologically coloured variant epistemic stance, I now examine the claim by Ochs (1992) that stance is the locus of association between social categories and linguistic forms. In brief, the linguistic means that a person uses to construct a stance become linked to that person's social categories. This linkage is referred to in linguistic anthropological literature as *indexicality*.

2.2.3 Indexicality

The repeated use of a particular variant in the construction of a particular stance comes to afford that variant meaning beyond its referential content: it comes to "stand for" or "point to" a stance. This link between linguistic form and social function is referred to by Ochs (1992) as direct *indexicality*.³² For example, the use of swear words can index a stance of dismissiveness, aggression or jocularity. The fact that the interpretation of what is being indexed requires further context is evidence that the indexical meaning is not part of the semantic content of swear words: their use in the expression of particular stances is what gives them this additional social meaning. Not all possible stances are equally available to all people. For example, it would be incongruous for a three year-old child to adopt

³² See also Silverstein (e.g. 2003) and Agha (e.g. 2007).

an aggressive stance by deploying swear words. For this reason, swear words do not immediately make one think of young children. Rather, linguistic forms come to indirectly index the social categories of people who stereotypically adopt the stances they directly index. If men are stereotypically more aggressive than women, and if swearing is a way to “do aggression”, then swearing will come to indirectly index maleness.

Ochs (1996) stresses the structuralist dependence of this indexical linkage between linguistic form and stance on other elements of the socially situated linguistic construction of stance:

It is also important to note before going on that assignment of indexical meaning involves more than perception of a single linguistic form alone. Rather, the situational interpretation of any one linguistic form is an outcome of its relation to co-occurring linguistic forms in the prior and present discourse structure, to subjective understandings of the propositional content of the utterances thus far and of the activity those utterances are constituting as well as subjective understandings of gestures and other dimensions of the non-vocal setting (see Brown & Levinson 1979, Ochs 1988, 1990, 1992, Silverstein 1987).

(Ochs 1996: 414)

Ochs highlights that linguistic signs only become noticeable in contrast to other signs, i.e. that linguistic variants can only index stances because they are different from other variants. This structuralist notion of distinction pervades the linguistic anthropological conception of indexicality. Linguistic styles are aggregates of such linguistic distinctions which “hang together” by being habitually used together in the construction of stance (and that stance itself also has to be distinctive from other stances). But Ochs points out that noticing difference is a

subjective matter, i.e. it depends on individuals' understandings of the propositional and contextual content of talk-in-interaction. The logical gaps from linguistic forms to the social categories they index are finessed by ideology. In other words, our ideological commitments influence what distinctions we recognize in the socio-cultural field, and they provide "paths of least resistance" in interpreting what social distinction is indexed by what linguistic distinction. Irvine and Gal (2000) identify three processes by which ideology and social meaning interact: *iconization*, *recursivity* and *erasure*, and I discuss these next.

Iconization describes how linguistic differences are interpreted as being inherent to the social categories they index. To continue with the above example, this would mean that swearing actually seems to *sound* masculine, i.e. the linguistic form is perceived to resemble the category it indexes.³³ Irvine (2001: 33) suggests that iconization works by individuals' picking out 'qualities supposedly shared' by the linguistic form and the category it has come to index; 'their connection thus appears to be necessary, perhaps even "natural," because of the supposedly shared qualities'. For example, "swearing sounds aggressive", and "men are aggressive", therefore "swearing is manly".

Recursivity describes how large-scale social and linguistic structures are reproduced on smaller scales. Irvine (2001: 33) couches this in terms of oppositions, or patterns of difference, that obtain between groups being recapitulated within groups. Men swear a lot, and women swear a little, but within either group, that opposition is recreated such that men who swear relatively little might "sound female", while men who swear a great deal might sound "very

³³ Both the terms *icon* and *index* derive from C.S. Peirce's (see e.g. Peirce 1958) ontology of signs. Irvine and Gal note that, in Peirce's terms, the 'perceived icon' is called a *rheme*, and Gal (2005) suggests that the process of iconization should perhaps more properly be called *rhematization*.

male”. Irvine notes that this microcosmic resemblance of a smaller group to a larger counterpart is another example of iconicity.

Erasure is the ‘process in which an ideology simplifies the sociolinguistic field’ (Irvine 2001: 33). In order to believe that swearing is masculine, it is necessary to ignore the fact that some men hardly swear and some women swear a lot. Individuals in those categories are anomalous, and they are erased by the ideology of stereotypical gender roles: they are not spoken about. Individuals who are habitually erased or ignored due to the pervasive effect of hegemonic ideologies can become disenfranchised or oppressed. This effect is noticeable in recent mainstream media discourses about feminism which are dominated by “privileged” journalists, i.e. writers who lie at the intersection of multiple hegemonic categories (they are predominantly heterosexual, wealthy, white, cissexual and so on). In writing about what feminism should be or what feminism needs, these writers often dismiss marginalized groups as irrelevant.³⁴

Ochs (1996: 415–24) suggests some general properties and principles of indexicality which illustrate how that concept fits in with the rest of this thesis. The first is the social constructionist *property of constitutiveness* whereby the use of indexical forms constitutes social distinctions, e.g. between distinctive identities and communities, by materializing them linguistically. Next is the

³⁴ This has been prominently played out on the social media website Twitter where marginalized groups have the facility to directly address these hegemonic self-appointed gatekeepers of Feminism. Oft-repeated responses include Caitlin Moran tweeting that she ‘literally couldn’t give a shit’ about black people, apparently claiming to be ‘colour-blind’, which is itself a position of hegemonic erasure since it ignores the unequal power distributions with respect to race by professing to treat blacks and whites equally. Similarly, the transsexual community has been repeatedly denigrated as having no legitimate claim on feminism. The immediacy of feedback on Twitter has led to hegemonic writers closing ranks by satirizing the shorthand call to “check your privilege”, and via a defensive strategy of conflation of the legitimate criticisms of their unthinking reinforcement of hegemonic ideologies and concomitant erasure of already marginalized groups on the one hand, with online bullying in the form of “trolling”, “stalking”, and threats of assault, rape and murder on the other.

structuralist notion that stances resonate with past, present and future stances, and thus are ‘*temporally transcendent*’ (Erez Levon, p.c.). This transcendence of stances into more enduring identities (see e.g. Kiesling 2001) has been called *stance accretion* (e.g. Du Bois 2002; Rauniomaa 2003; Eckert 2012). In research focusing on the linguistic varieties that emerge through stance accretion, (discussed in Section 2.3 below), this notion has been called *enregisterment* (Agha 2003, 2005, 2007). Ochs (1996) regards these processes as human universals (*the universal culture principle*). Their culturally-specific dimension by contrast lies in the idea that indexes are interpreted depending on ideology, and upon the local culture into which one is socialized (*the local culture principle*). In this thesis I investigate this very proposal. I focus on the interpretive difference between diverse ideologies of especially epistemological character that have become institutionalized into social groups called *academic disciplines*. If Ochs is right, then members of different academic disciplines would be expected to interpret evidential language differently. This suggests that members of different disciplines would regard a token of the same evidential item (e.g. the modal verb *must*) as indexing different stances (e.g. a stance of personal authoritativeness versus as stance of objective logical deduction). This may be reflected in differential use of the same evidential items across disciplines. In the next section, I give an overview of the linguistic forms implicated in the construction of epistemic stance (these variables are reviewed in detail in Chapters 3 and 4), and I also review the existing research into the variable behaviour of these linguistic forms across academic disciplines. Not only is epistemic policy a matter of frequent explicit comment in academia, the range of possible epistemic policies is

particularly diverse there. If the theoretical model described above bears predictive fruit anywhere, it will be there.

2.3 The case of Academic English

The empirical focus of this thesis is on the language of academia, and in particular in the relationship between variable epistemic policy (beliefs and attitudes about what knowledge is, and how to get it) and the linguistic construction of disciplinary difference. I adopt the linguistic constructionist conception of indexicality as constitutive of epistemological difference (Ochs 1992, 1996; Silverstein 2003; Agha 2003, 2005, 2007), and I investigate the evidential variables used to do this via the epistemic stances they materialize. I focus on the *de facto lingua franca* of academia: English.

Research on English for Academic Purposes (EAP) is concerned with those characteristics of English particular to different academic disciplines³⁵. It is a practice-oriented field which aims to produce research findings with immediate pedagogical value, such as the characteristics of research articles in physics or medicine. EAP research has accumulated a wealth of data, mostly on written rather than spoken Academic English (AE). Epistemological diversity is widely understood by EAP researchers to be an important element of the academic ecosystem, and epistemological reasons are often given as partial explanations for the linguistic phenomena they describe. The role of epistemology is, however, invariably subordinated to the contingent communicative purposes of the text or

³⁵ EAP can also be more broadly understood to encompass all institutional registers found in universities (see e.g. Biber 2006).

talk under analysis; research articles, conference presentations and lectures are conceived of as *genres* that have largely decoupled from disciplinarity to develop a “life of their own”, particularly in the spoken *registers* (see Section 2.3.1).

2.3.1 Genre, register and style

Genre, *register* and *style* all refer to ways of speaking, but they are associated with different research areas, and they are not all synonymous. *Style* was discussed at length in the first part of this chapter, and it is latterly conceived of by sociolinguists as ways of speaking in particular interactional settings. Labov’s antecedent conception of style as attention-paid-to-speech relied on the notion of formality, i.e. the idea that certain styles are more appropriate in certain types of situation. Today, this conception of style is closer to what is understood by sociolinguists to constitute a *register*. By these definitions, styles are more local, fleeting, and intersubjective than registers. Registers may be associated with particular stereotypical social roles such as professions (see e.g. Agha 2007: 80): lawyers write contracts in *legalese*; UK Members of Parliament are required not to use “unparliamentary language” such as swearing or accusing each other of lying.³⁶ The way in which registers are shaped by institutional practice is described lucidly by Agha (2007):

³⁶ Michael Gove MP (Conservative), who is the UK Education Secretary at the time of writing, has inspired such widespread resentment among teachers, students, and auxiliary staff that Labour MP Tom Watson was moved to call him a *miserable pipsqueak*. *Pipsqueak* was immediately judged by the Speaker of the House to be “unparliamentary language”, and that word was henceforth consigned to the same set of forbidden words as *blackguard*, *git*, *guttersnipe*, *stoolpigeon*, *tart* and *sod*.

Processes of register socialization continue throughout adult life as well. One cannot become a doctor or a lawyer, for example, without acquiring the forms of speech appropriate to the practices of medicine or law, or without an understanding of the values – both cognitive and interactional ones – linked to their use. In these cases the process of language socialization typically includes extended affiliation with educational institutions, such as law school or medical school, through which individuals acquire the ability to use profession-specific registers of the language. Overt prescription plays a role in these settings but other types of more implicit metalinguistic activity occur routinely as well (Mertz 1998). Once acquired, proficiency in the register functions as a tacit emblem of group membership throughout adult life and, in cases such as law or medicine, is readily treated as an index of achieved professional identity.

(Agha 2007: 156)

Agha (2007) uses the term '*enregisterment*, or recognized existence' (Agha 2007: 61 my emphasis) to describe 'the processes and practices whereby performable signs become recognized (and regrouped) as belonging to distinct, differentially valorized semiotic registers by a population' (2007: 80–81). In other words, registers and styles both rely on the structural concept of distinctiveness. Registers are enduring styles.

The third closely related term in the title of this subsection is *genre*. Swales (1990: 58) defines genre as 'a class of communicative events, the members of which share some set of communicative purposes'. Martin and Rose (2003: 7) refer to a 'staged, goal-oriented social process'. In other words, genre is conceived of in EAP research as the language used for a particular type of (often named) communicative activity, such as The Academic Lecture or The Research Article. The communicative purpose of a research article is often supposed to be to persuade the reader of an interpretation of data. What kind of data is considered (e.g. a literary text, or the emission spectrum of a star) and what kind of

interpretive and persuasive strategies are appropriate will vary from discipline to discipline. This means that the idea of comparing one genre across several disciplines is somewhat problematic. On the one hand, genres may be recognized in several disciplines, share the same name, and be involved in many of the same practices. On the other hand, the range of different research objects and different epistemic policies across academia means that genres may be less generic than they at first appear.

Genre and register are overlapping terms for the comparison of ways of speaking associated with stereotypical situations and institutions. This is close to the early Labovian conception of style (related to societal class structure). A genre is a type of text or talk, e.g. a lecture, or a Gothic novel (see e.g. Swales 1990; Biber and Conrad 2009). Genre, then, may be defined in terms of the linguistic product of a specialized activity. A register is the specialized language associated with that activity (see e.g. Biber and Conrad 2009). Since activities are distributed throughout society in a stratified manner, genres and registers are socially situated constructs (not everyone gets to participate in a lecture or read or write a novel). Likewise, styles are socially embedded varieties. Styles, genres and registers have areas of difference too, perhaps most obviously in their relative transience or endurance, which is related to the relative transience or endurance of the ‘institutions’ within which they are (re)produced, including physical institutions like universities, prisons and governments, but also intangible institutions like contracts, habits and legible personae. More recent sociolinguistic treatments of style allow for individuals to draw on genre and register in a more fine-grained way since these forms of language may associate with local categories that

emerge in interaction. Agentive treatments of style would conceive of speakers as constructing their identities through selection or rejection of linguistic resources perceived to index the social categories and practices to which the registers and genres attach. This process of linguistically materialized identity construction then serves to produce and reproduce more enduring communities and other institutional structures.

2.3.2 Linguistic variables in the construction of disciplinary difference

In this section I review the EAP research on evidential variables. First I give an overview of the variables implicated in the construction of *epistemic stance*. Then I look at research that has investigated these variables in the language of academia. Relatively little cross-disciplinary comparison has been done on evidential variables in EAP, with almost all work looking at the behaviour of these variables within genres of single disciplines; almost no research in other areas of linguistics has looked at variation by discipline. This means that there is currently very little empirical evidence that can illuminate the relationship between epistemological variation and linguistic variation; this thesis provides a comprehensive theory of, and experimental examination of, this relationship. Studies of evidential variables across disciplines are reviewed in Section 2.3.3.

Considering the goals of academic registers helps to explain why stance is centrally important in these registers. A crucial aspect of liberal education is the ability to assess the status of information, being able to discriminate among a host of epistemic distinctions, from ‘speculation’ to ‘fact’. These distinctions reflect the reliability of a statement, as well as the possibility that statements are offered from

a particular perspective. In addition, instructors and authors take advantage of their positions of power to convey their own opinions and attitudes. Thus, in addition to simply conveying propositional information, teachers shape the ways that students approach knowledge, helping them to assess how statements are to be interpreted (e.g., whether they should be adopted as fact, criticized, or understood from a particular perspective).

Biber (2006: 87)

Biber (2006: 92–93) gives a comprehensive list of linguistic features that could be used in the construction of stance (reproduced in Table 2.1 below).

Table 2.1 Common lexico-grammatical features used for stance analyses³⁷

1. Modal and semi-modal verbs (see LGSWE, pp. 483ff.)	
Possibility/ permission/ ability	<i>can, could, may, might</i>
Necessity/ obligation	<i>must, should, (had) better, have to, got to, ought to</i>
Prediction/ volition	<i>will, would, shall, be going to</i>
2. Stance adverbs (see LGSWE, pp. 557–58; 853–74)	
Epistemic certainty	<i>actually, always, certainly, definitely, indeed, inevitably, in fact, never, of course, obviously, really, undoubtedly, without doubt, no doubt</i>
Epistemic likelihood	<i>apparently, evidently, kind of, in most cases/instances, perhaps, possibly, predictably, probably, roughly, sort of, maybe</i>
Attitude	<i>amazingly, astonishingly, conveniently, curiously, hopefully, even worse, fortunately, importantly, ironically, rightly, sadly, surprisingly, unfortunately</i>
Style	<i>according to, confidentially, frankly, generally, honestly, mainly, technically, truthfully, typically, reportedly, primarily, usually</i>
3.1a. Stance complement clauses controlled by stance verb + <i>that</i>-clause (see LGSWE, pp. 661–70)	
Epistemic certainty	<i>conclude, demonstrate, determine, discover, find, know, learn, mean, notice, observe, prove, realize, recognize, remember, see, show, understand</i>
Epistemic likelihood	<i>assume, believe, doubt, gather, guess, hypothesize, imagine, predict, presuppose, presume, reckon, seem, speculate, suppose, suspect, think</i>
Attitude verbs	<i>agree, anticipate, complain, concede, ensure, expect, fear, feel, forget, hope, mind, prefer, pretend, require, wish, worry</i>
Speech act/ communication	<i>announce, argue, assert, claim, contend, declare, emphasize, explain, imply, insist, mention, promise, propose, recommend, remark, respond, say, state, suggest, tell</i>
3.1b. Stance complement clauses controlled by stance verb + <i>to</i>-clause (see LGSWE, pp. 693–715)	
Probability (likelihood)	<i>appear, happen, seem, tend</i>

³⁷ Biber's (2006) summary table reproduced here is based on Biber *et al.* (1999) which he abbreviates as LGSWE

Cognition/ perception (likelihood)	<i>assume, believe, consider, expect, find, forget, imagine, judge, know, learn, presume, pretend, remember, suppose</i>
Desire/intention /decision	<i>agree, choose, decide, hate, hesitate, hope, intend, like, love, mean, need, plan, prefer, prepare, refuse, want, wish</i>
Causation/ modality/effort	<i>allow, attempt, enable, encourage, fail, help, instruct, manage, oblige, order, permit, persuade, prompt, require, seek, try</i>
Speech act/ communication	<i>ask, claim, invite, promise, remind, request, be said, show, teach, tell, urge, warn</i>
3.2a. Stance complement clauses controlled by stance adjective + <i>that</i>-clause (see LGSWE, pp. 671–674)	
Epistemic certainty	<i>apparent, certain, clear, confident, convinced, correct, evident, false, impossible, inevitable, obvious, positive, right, sure, true, well-known</i>
Epistemic likelihood	<i>doubtful, likely, possible, probably, unlikely</i>
Attitude/ emotion	<i>afraid, amazed, aware, concerned, disappointed, encouraged, glad, happy, hopeful, pleased, shocked, surprised, worried</i>
Evaluation	<i>amazing, appropriate, conceivable, crucial, essential, fortunate, imperative, inconceivable, incredible, interesting, luck, necessary, nice, noteworthy, odd, ridiculous, strange, surprising, unacceptable, unfortunate</i>
3.2a. Stance complement clauses controlled by stance adjective + <i>to</i>-clause (see LGSWE, pp. 716–21)	
Epistemic	<i>apt, certain, due, guaranteed, liable, likely, prone, unlikely, sure</i>
Attitude/ emotion	<i>afraid, ashamed, disappointed, embarrassed, glad, happy, pleased, proud, puzzled, relieved, sorry, surprised, worried</i>
Evaluation	<i>(in)appropriate, bad/worse, good/better/best, convenient, essential, important, interesting, necessary, nice, reasonable, silly, smart, stupid, surprising, useful, useless, unreasonably, wise, wrong</i>
Ability/ willingness	<i>(un)able, anxious, careful, determined, eager, eligible, hesitant, inclined, obliged, prepared, ready, reluctant, (un)willing</i>
Ease/difficulty	<i>difficult, easier, easy, hard, (im)possible, tough</i>
3.3a. Stance complement clauses controlled by stance noun + <i>that</i>-clause (see LGSWE, pp. 648–51)	
Epistemic certainty	<i>assertion, conclusion, conviction, discovery, doubt, fact, knowledge, observation, principle, realization, result, statement</i>
Epistemic likelihood	<i>assumption, belief, claim, contention, feeling, hypothesis, idea, implication, impression, notion, opinion, possibility, presumption, suggestion</i>
Attitude/ perspective	<i>grounds, hope, reason, view, thought</i>
Non-factive communication	<i>comment, news, proposal, proposition, remark, report, requirement</i>
3.3b. Stance complement clauses controlled by stance noun + <i>to</i>-clause (see LGSWE, pp. 652–53)	
	<i>agreement, decision, desire, failure, inclination, intention, obligation, opportunity, plan, promise, proposal, reluctance, responsibility, right, tendency, threat, wish, willingness</i>

It is beyond the scope of a single thesis to review the research on all of the items listed in Table 2.1—even if limited to the EAP subdiscipline. Gray and Biber (2012: 19) make the strong claim that ‘epistemic stance meanings are considerably more important in research writing than the attitudinal meanings’, which is suggestive that many of the variables listed above are less important for the present study. However, I argued above that the boundary between epistemic and affective is fuzzy, and a glance at Table 2.1 shows that analytic judgements can at times appear anomalous to fresh eyes (e.g. in Section 3.2a of Table 2.1, the adverbs *possible* and *impossible* are put into a separate category from the other epistemic adverbs such as *likely* and *certain*).

Table 2.1 highlights that several different parts of speech can contribute to the linguistic construction of stance: modal verbs and adverbs; and complementizing nouns, adjectives and adverbs. A problem for the quantitative investigation of these variables, then, is that it is not immediately obvious how to group them into variables and variants: what exactly is varying?

Variationist sociolinguistics is sometimes equated with sociophonetics, i.e. the investigation of social patterns in the way people pronounce things. These “things” are linguistic items that are assumed to be capable of varying: *linguistic variables*. A linguistic variable is a set of linguistic forms (*variants*) that alternate in language use. For example, variable (ing) may be realized in the Standard English manner as [ɪŋ], or it may be realized in a non-standard manner as [ɪn] (which is popularly referred to as “g-dropping”, due to the imagined orthographic representation of this variant as *in*). Three questions arise for the analysis of this variable. First, are these two forms really variants of the same thing, or are they

better analysed as two different things? This question might be called the *problem of equivalence*. Secondly, are there any other variant forms that this variable can take, i.e. is the set of variants *exhaustive*? The methodological desideratum of identifying an exhaustive list of variants is called the *principle of accountability* (Labov 1966: 49). Thirdly, can every occurrence of (ing) vary in this way, or is there some restriction on which *ings* are actually variable? This question aims to identify the *envelope of variation* (Milroy and Gordon 2003:180), i.e. to circumscribe the context within which the variable varies.

These three questions arise for any linguistic variable, and it has been assumed (e.g. by Labov 1982:87) that it is easier to answer them for phonological variables than for variables at other linguistic levels such as morphosyntactic, pragmatic or discourse-level variables. The (ing) variants above are supposed to be fairly straightforwardly *semantically* equivalent in that alternating between them does not change the denotation (the dictionary meaning) of the word in which they occur. A subset of all possible *ings* should also be identified which is *structurally equivalent*. For phonological variables like (ing), this would for example require that they always be word-final, or that they are part of the tense and aspect verb morphology rather than part of the spelling of a lexical item (i.e. only the second *ing* in *singing*). This kind of stipulation serves to circumscribe the variable context, i.e. it identifies the envelope of variation.

Identifying an exhaustive list of variants involves some arbitrary operationalization. The variants identified above for (ing) are likely to be “canonical” cases that represent a cluster of more or less phonologically similar realizations, and it is for the analyst to determine how to render this continuum

discrete—usually with reference to the community that evaluates the variation, i.e. via an *emic* understanding of the *etic* forms (Pike 1954). It is typically the case, too, that a variable includes a *null variant*, i.e. the optional absence of phonetic realization, which is only rendered noticeable and therefore countable once the envelope of variation has been identified.

The notion of the sociolinguistic variable has gradually expanded to include morphosyntactic variation, e.g. the variable production of *was* and *were* (e.g. Cheshire 1982; Cheshire *et al.* 2008); variable negative concord (e.g. Moore 2004); quotatives such as *said* and *be like* (e.g. Buchstaller 2013) and discourse markers such as *like* and *innit* (e.g. Andersen 2001; Schlee 2008, 2009). All of these studies have needed to address the issue of substitutability of the variants of their putative variables: are the variants alternative ways of saying the same thing? Many have argued that they are not. There are two responses to this. First, sociolinguistics can be reduced to *sociophonetics*. Secondly, what counts as a variable can be extended to include variation at the level of lexical or morphosyntactic choice, or of discourse-level structures. The latter option appears to be the *de facto* resolution of this issue in the field of sociolinguistics (see e.g. Pichler 2010), and that is the approach I adopt here, including several linguistic levels (e.g. modal verbs, lexical verbs, adverbs) under the discourse-level phenomenon of variable epistemic stance. I next discuss the reasons for doing so.

Given the structuralist commitments of classical linguistics, it is not tenable that phonetic variants are ways of saying the same thing in terms of connotation.³⁸ If one variant is the “standard” and another is “non-standard”, then

³⁸ Denotation may be viewed as an abstraction over a variable semantic content distributed in a community. If there is then no single denotation, but rather a set of *family resemblances*

using different variants does indeed change the meaning of the utterance. Furthermore, I am interested in whether and how academics in different disciplines vary in their stance construction, so I am comparing the stances they take. The expectation is that differing epistemological commitments will associate with different epistemic stances, i.e. that the semantic content of the stances will vary. In short, I am less interested in how disciplines say the same thing in different ways, and more interested in the extent to which they use a shared pool of linguistic resources to say different things. The possibility of a *sociosemantics* is premised, by definition, on the assumption that meaning is *not* constant among variants of the same variable. This also requires that *the sociolinguistic variable* be construed as a higher-level linguistic unit than a single phoneme. The issue of the envelope of variation will be side-stepped in Chapter 3 by looking at ratios of linguistic forms rather than comparing absolute numbers or frequencies. In Chapters 4 and 5 I operationalize stance at the level of the clause, and I approximate an exhaustive coding rubric including, for example, linguistic forms of the type in Table 2.1 above.

Lavandera argues that the requirement of semantic equivalence be relaxed for non-phonological variants, proposing instead ‘a condition of functional comparability’ (Lavandera 1978: 181). Dines makes a similar point, suggesting that ‘discourse variables may be defined on the basis of common discourse function.’ (Dines 1980: 13). Much of the analysis in this thesis, then, rests on the assumption of functional relatedness of the variants under discussion. Indeed, rather than identifying functional equivalents, I identify items that I argue lie on

(Wittgenstein 1953), then it could be argued that connotation is a more valid conception of meaning as applied to a sociolinguistic variable—particularly a semantic one.

related functional dimensions. In other words, I argue that modal verbs such as *must* and *may*, adverbs such as *possibly* and *probably*, etc, are *functionally commensurate*. In short, I make a somewhat novel expansion of the notion of the linguistic variable both in terms of the treatment of semantic relatedness of the variants, and in terms of the envelope of variation. The optionality and morphological diversity of the variants means that variable stance is characterized by large numbers of null tokens, and a large number of low-frequency variants. This contrasts with typical sociolinguistic variables which are more clearly semantically equivalent, and which have a relatively small number of variants in alternation, of which the null variant is relatively rare.

A second challenge to the variationist analysis of stance construction is that many variants are prohibitively rare. Statistical analysis of the variability in stance construction by discipline (or any social category) is only possible if the variants occur in sufficiently high token numbers. I therefore confine this review to the most common epistemic stance markers identified in the EAP literature, and I explore additional variables in subsequent chapters.

Biber (2006: 95–114) notes that the variables listed in Table 2.1 are more common in spoken than written registers. Modal verbs are the most common overall. Epistemic adverbs are the most common type of adverb (certainty more common than likelihood). Stance verbs with *that*-complements follow the same patterns, while those with *to*-complements are equally frequent in spoken and written, with verbs of desire being the most frequent type. Noun-governed *that*- and *to*-clauses are relatively rare, and mainly confined to written registers.

Lyons defines *epistemic modality* in a broad manner appropriate for the sociolinguistic analysis of high-level variation:

Any utterance in which the speaker explicitly qualifies his commitment to the truth of the proposition expressed by the sentence he utters, whether this qualification is made explicit in the verbal component [...] or in the prosodic or paralinguistic component, is an epistemically modal, or modalized, utterance.

(Lyons 1977: 797)

Epistemic modality thus expresses the *commitment component* of an epistemic stance: how committed a speaker is to (the truth of) the proposition they are modalizing. This modalization can be done with modal verbs, adverbs, adjectives or nouns listed in Table 2.1 above. Also, a speaker's commitment to a proposition can be marked using epistemic verbs such as *know* or *think*. The *justification component* of an epistemic stance is the information source, expressed by *evidential verbs*.³⁹ This category cuts across several used by Biber (2006) to again include verbs, adverbs, adjectives and nouns that refer to the manner in which a knowledge claim was reached (e.g. *argue*, *deduce*, *demonstrate*). Epistemic stance is thus here used to mean the linguistic expression of the speaker's attitude to what they are saying *qua* knowledge, including the justification and commitment components.⁴⁰ I argue that stance can be operationalized by attending to these two dimensions.⁴¹ In the next section I review the research that has focused on cross-

³⁹ This is similar to Aikenvald's (2004) narrow evidentiality. For Aikenvald, evidentiality is a system of obligatory grammatical marking of information source. I am expanding that definition here to include all the non-obligatory ways of indicating the source of a knowledge claim.

⁴⁰ This thesis focuses on variation at the level of discourse and lexicon. It does not examine phonetic or prosodic phenomena, or communication via non-linguistic channels such as gesture.

⁴¹ I use this distinction between dimensions loosely as, once again, these categories are fuzzy.

disciplinary variation in these two dimensions. In Chapters 3 and 4 I discuss research on the variables from a non-variationist approach, and I used that research to inform how I operationalize epistemic stance variables, and also my coding distinctions for those variables.

2.3.3 Linguistic variation across disciplines

The English for specific purposes (EAP) research programme has focused more on written than spoken Academic English, and has also generally preferred small-scale analysis at the level of genres (Swales 1990) within single disciplines (or a few closely-related disciplines) rather than the kind of cross-disciplinary comparison I am presenting here. A small amount of work has been done on spoken Academic English, and it is a matter of debate in the EAP literature to what extent written and spoken EAP are comparable. Importantly for the present research however, the theory that inter-disciplinary linguistic variation arises in large part from (and reproduces) inter-disciplinary epistemological variation has not been thoroughly explored.

I now review the limited cross-disciplinary comparisons of the commitment and justification components of stance present in the EAP literature. Commitment is materialized as modality, including *hedges* and *boosters* and modal verbs. Justification is materialized via evidential verbs.

Hyland (2006: 22–36) finds that *hedges* and *boosters* are used with differing frequencies across disciplines in research articles. Hedges reduce the speaker's commitment to a proposition e.g. by using weak modality (e.g. *might* or

possibly), while boosters increase commitment by using strong modality (e.g. *must* or *necessarily*) (see e.g. Holmes 1984). Hyland is concerned with the overall levels of stance vocabulary (e.g. finding that philosophy uses more stance features than any other disciplines),⁴² but a re-analysis of his data from 240 research articles in 8 disciplines shows that all disciplines use more hedges than boosters. This is particularly marked in social sciences where the ratio of hedges to boosters is 94:6. Applied linguistics, marketing, biology and electrical engineering all have a ratio of around 75:25, while physics, mechanical engineering and philosophy have the most even ratio at around 65:35. This is suggestive of a gradual progression in general level of epistemic commitment from social sciences through to physics, but the placement of biology and philosophy require some careful consideration.

Hyland (2009: 13) says that ‘the less frequent use of hedges is one way of minimising the researcher’s role, and so is the preference for modals over cognitive verbs.’ This means that hedges can be used to mitigate the authorial/authoritarian voice of a research article, and that avoiding cognitive verbs (such as *think* and *know*) in favour of modals also achieves this. While the equivalency of cognitive and modal verbs agrees with my grouping of them under the truth component of stance above, the point that Hyland (2009) makes about hedging does not appear to concord with the relative placements of physics and marketing in his earlier (2006) data.

⁴² This finding is of limited use since it does not adhere to Labov’s principle of accountability (see e.g. Labov 1972). This is not an isolated occurrence of the problem within EAP research.

Poos and Simpson (2002) investigated the cross-disciplinary frequency of the hedges *sort of* and *kind of* in spoken data from the MICASE⁴³ corpus, finding them more common in the arts and humanities and social sciences than in the biological and physical sciences (see also Simpson-Vlach 2006; Schleef 2009). Schleef (2008, 2009) examines these discourse markers across disciplines in MICASE lectures. His findings agree with Poos and Simpson (2002), and he also finds that disciplinary affiliation is a more powerful predictor of discourse marker use than age and gender (2008) and (German versus US) nationality (2009). Rowley-Jolivet and Carter-Thomas (2005) also find that discourse marker use (including *however*, *well*, *now*, *so*, and their French equivalents) by British/American and French academics presenting physics and medicine research at conferences is better predicted by disciplinary affiliation than by native language, even in epistemologically quite closely related disciplines.

Explanations for the cross-disciplinary variation in discourse marker use have usually been couched in terms of the hard sciences being more densely technical, and therefore requiring more frequent checks that the audience is following what is being said.⁴⁴ A quick glance at a Judith Butler or Michael Silverstein text renders this explanation deeply unsatisfying, and I suggest that discourse markers such as those listed above are, in addition to breaking up and organizing talk, functioning to “bring the audience on board”. In other words, they subsume the audience into the speaker’s understanding of the object of discussion (*right?*). I argue that this is more likely to happen in the “hard” disciplines

⁴³ Michigan Corpus of Academic Spoken English (Simpson *et al.* 2002).

⁴⁴ Cf. Schachter *et al.* (1991) who analyse the frequency of filled pauses (*um* and *ah*) across disciplines, and, finding them more common in the ‘soft’ disciplines, relate them to the amount of choice/ open-endedness of discipline, i.e. the fact that “hard” disciplines are “exact” sciences.

because they have a narrower range of epistemic policies available. They have fewer and less divergent ratified ways of seeing the data. This means there is less chance that an audience member will reject the interpretation being offered, and also that there is less chance of the speaker expecting their explanation to be rejected. This dual function of discourse markers as text-milestones and as “epistemological totalizers” is problematic in the arts and humanities where epistemological pluralism is *de riguer*. However, in the sciences, the epistemological function of discourse markers is inapplicable, so speakers are freer to punctuate their discourse with discourse markers.

With regard to modal verbs, Salager-Meyer (1992) analyses 84 medical abstracts divided into three types (research, case studies, review) and four sub-disciplinary areas (clinical, basic, epidemiological, operative). She found that ‘Modality is significantly more frequent in review articles, which means that the more universal the pretension of the claim, the more hedged the discourse.’ (Salager-Meyer 1992). This seems to contradict the finding reported in the following sentence however: ‘Medical text types do have a direct bearing on the use of tenses and modality whereas research types do not.’ One assumes that ‘basic’ medical research pretends to more universal claims than operative or clinical research, even if this was not reflected in modal verb use in the data examined.

Stotesbury (2003) analyses the abstracts of 300 research articles in humanities, social sciences and natural sciences. She found that *should* was as common as all other markers of strong modality (*need, necessary, must*, etc) in the humanities (8 versus 9 tokens), while the balance was more skewed in social

sciences (6 versus 8) and even more so in natural sciences (3 versus 10).⁴⁵ Sieller (1982: 63) found that spoken scientific and engineering discourse makes use of a more expanded set of modal verbs than written discourse; in her data the latter rely on *may* and *must*.

Piqué-Agordans, Posteguillo and Andreu-Besó (2002) compared the frequency of modal verbs in three corpora of research articles. They classified modal verbs according to modal flavour (*epistemic* versus *deontic*), which is a popular classification in formal linguistics since the seminal work by Kratzer (1977). I argue in Chapter 3 that this classification system is not appropriate for the present work. I reanalysed their data to compare the relative proportion of strong (*must*, *should*, *will*, etc.) to weak modal verbs (*may*, *might*, *can*, etc.) and found that the proportion in medicine is 20:80 (strong:weak), while this levels out to 28:72 in biology and 46:54 in literary criticism.⁴⁶ Varttala (2001: 207) analysed modal verbs in economics, medicine and technology writing. A re-analysis of his data shows that the ratio of strong to weak modals is 9:91 in medicine, and 15:85 in economics and technology.⁴⁷

There are some suggestive data, and interpretations, in the EAP literature. Modal verbs occur in reasonably low total numbers, so a large sample of text will be required. The balance of strong/weak modal verbs does appear to vary across disciplines (Piqué-Angordans *et al.* 2002). This single result, in light of the plausibility of Salager-Myer's first claim above, points to the need for more

⁴⁵ These differences, while suggestive, are not statistically significant.

⁴⁶ These ratios are normalized as percentages. Original token number ratios are: medicine 61:244 (20:80); biology 112:289 (28:72); and literary criticism 164:193 (46:54). See Table 2 in Piqué-Angordans *et al.* (2002: 53).

⁴⁷ These ratios are normalized to percentages. Original *per mil* frequency ratios are: medicine 0.60:6.05 (9:91); economics 0.65:3.72 (15:85); and technology 0.61:3.47 (15:85).

research on the variable use of modal verbs across disciplines in Academic English.

I now turn to the justification component of epistemic stance. Vold (2006b) distinguishes between more subjective and more objective epistemic modality markers:

Although all epistemic modality markers pragmatically presuppose an evaluating agent [...] *Assume, seem* and *appear* are all quite ‘subjective’, in the sense that they, by their semantics, presuppose a modalizing agent. [...] *Could, may, might* and *possible* on the other hand, refer to the notion of possibility and can be taken simply to state an eventuality without presupposing a specific modalizing agent.

(Vold 2006b: 234)

Vold (2006b) identifies her *subjective* epistemic markers with ‘mental state predicates’ (Nuyts 2001). Vold (2006a) examines 120 research articles in linguistics and medicine in three languages (French, Norwegian and English) and finds that *subjective* verbs are more frequent than *objective* modal words in linguistics texts, while this pattern is reversed in medical texts. She finds that this difference is small compared to the difference between languages.

Hyland (2009: 11) finds differences in the distribution of ‘reporting verbs’ across disciplines. In his research article data, the most frequent reporting verbs in “soft” disciplines are *say, suggest, argue* and *claim*, while in the “hard” disciplines they are *describe, find, report*, and *show*. The “soft” disciplines (philosophy, sociology, applied linguistics and marketing) seem to rely more on discursive processes of knowledge construction, while the “hard” disciplines (biology, electrical and mechanical engineering and physics) rely more on referring to pre-existing data or arguments. Fløttum, Kinn and Dahl (2006: 208–

09) compare 150 economics, medicine and linguistics articles, finding some common ground with Hyland's results (*argue* and *suggest* in linguistics; *find* and *show* in economics; and *show* in medicine). Medicine articles also favour *examine*, *observe*, and *demonstrate*; economists *estimate* and *assume*; while linguists *assume*, *suggest* and *know*. What these findings and interpretations point to is a class of evidential verbs including mental state predicates and reporting verbs which can be divided into objective and subjective verbs depending on the process of justification being adduced for the knowledge claim. The terms *objective* and *subjective* are quite loaded, and a more refined classification will be attempted in subsequent chapters.

2.4 Summary

Having reviewed the relevant concepts from social epistemology, linguistic anthropology, and EAP, I now clarify the general research questions of this thesis. The most basic question I address in the present research is: What is the relationship between epistemological variation and linguistic variation? This question can be addressed from a more linguistic and a more social perspective by reframing it as two interrelated questions: What linguistic forms are used in epistemic stance construction? and Do those forms index epistemic policies and EPR? Both questions are difficult to address directly, and I will approach them by combining research methods in the next three chapters. In Chapter 3 I perform a corpus analysis of research articles. I test whether three linguistic forms previously implicated in the linguistic expression of epistemic stance demonstrate

variability between and within academic disciplines. In Chapters 4 and 5 I analyse data collected from interviews I performed with 34 academics in a range of disciplines. I explore the evidence for the indexical nature of the relationship between language and epistemology by looking for evidence of iconization, recursivity and erasure, and I evaluate the level of salience of the linguistic correlates of EPR by analysing participant's interview talk.

Using these investigative methods, I interrogate the nature of disciplinarity. I have argued that a discipline represents a more or less heterogeneous, *wide* or *narrow* epistemic policy range (EPR). This ideological differentiation lays the foundation for the indexical processes whereby linguistic forms come to acquire social meaning. I will therefore be looking not only for evidence of those indexical processes, but also directly for evidence that disciplines are “decoupled” from epistemic policies. In other words, I evaluate whether attending to epistemic policy reveals more structure, more orderly heterogeneity, than is apparent when attending to disciplinary categories. The implications of this could be important for developing an explanatory framework for the abundant empirical findings in EAP research.

In Chapters 4 I develop a way of quantifying epistemic stance via an epistemic stance index (ESI). This allows me to perform the first variationist investigation of epistemic stance, and to interrogate its status as a sociolinguistic variable. The ESI also offers the potential to develop a quantitative science of social epistemology by facilitating a “sociolinguistic turn” in what is presently a highly theoretical field with some classic examples of rich ethnographies (e.g. Latour and Woolgar 1986), but whose generalizability remains uncertain.

Chapter 3. Corpus study: Methods and Results

In this thesis, I investigate the relationship between epistemological variation and linguistic variation. In Chapters 1 and 2, I reviewed the epistemological and sociolinguistic concepts relevant to the present investigation, and I developed a model of the linguistic construction of epistemological difference. In the next three chapters I explore the empirical evidence for this model, focusing on the case of academia, where epistemological difference is particularly salient. I first look in the present chapter at the distribution of a small number of evidential variables in written academic discourse. I then examine a wider set of variables in interview speech in Chapters 4 and 5.

The present chapter aims to evaluate whether the putative relationship between language and epistemology is amenable to quantitative sociolinguistic analysis by answering the following questions: are there general patterns of linguistic variation across academic disciplines? In other words, if one looks at two academic disciplines, will similar linguistic differentiation obtain *within* both those disciplines? If so, does this differentiation resemble that at the largest scales within academia, i.e. that between Science and Arts?

To answer these questions, I examine the distribution of three forms of evidential language (epistemic adverbs, modal verbs, and evidential verbs) within three corpora of research articles. Modality and evidentiality are fundamental categories in epistemic stance (and they correspond to two elements of classical knowledge analysis: level of commitment, and justification, as discussed in Chapter 1. I suggest that the journals from which the articles are taken are representative of the range of *epistemic policies* (belief-forming practices) found

both within and between academic disciplines (see Section 3.1 below). In other words, the journals reflect the diversity of beliefs, values, attitudes and norms about knowledge that characterize academic disciplines. I have argued earlier in this thesis that such epistemological differentiation produces, and is produced by, the variable use of evidential language. I now examine the extent to which this model explains the distributions of the variables examined in these corpora of written Academic English.

The three corpora used here are structurally related. One corpus consists of articles drawn from journals that I suggest are representative⁴⁸ of the maximal epistemological difference *between* academic disciplines, broadly analogous to the popular stereotype of the Two Cultures (i.e. the Arts and Science disciplines discussed in Chapter 1). Two further corpora consist of journals that I argue span the epistemological range *within* two sub/disciplines, namely psychology and sociolinguistics, chosen for their epistemological heterogeneity. By comparing the observed patterns of inter- and intra-disciplinary linguistic variation, I am able to evaluate the extent to which written academic discourse instantiates indexical *recursivity* (Irvine and Gal 2000; Irvine 2001; reviewed in Section 2.3). In other words, I investigate the extent to which patterns of linguistic differentiation found at large scales are recapitulated at small scales.

As discussed in the Chapter 1, it is a considerable simplification to contrast Arts with Science, both across academia as a whole, and as a recursively instantiated binary division within each discipline. I proposed that these epistemological archetypes are indicative of sets of epistemic policies which may

⁴⁸ See Section 3.1 below for a more detailed discussion of corpus structure.

be differentially adopted by individuals for various purposes. I suggested that the archetypal epistemic policies contain the following “stable” bundles of policy elements:

Science $\langle S+, K_{JTB}, J_{int}, T_{real}, I_{obj} \rangle$

and

Arts $\langle S_o, K_{JB}, J_{int}, T_{non}, I_{subj} \rangle$

This formalism was discussed in detail in Chapter 1, but it can be glossed as shown in Table 3.1 (K stands for knowledge).

Table 3.1 Stable epistemic policy bundle element variants in Arts and Science

	<i>Science</i>	<i>Arts</i>
S-policy	$\langle S+ \rangle$	$\langle S_o \rangle$
possibility of K	epistemism <i>K is possible</i>	Pyrrhonic skepticism <i>withhold judgement</i>
K-policy	$\langle K_{JTB} \rangle$	$\langle K_{JB} \rangle$
analysis of K	classical <i>justified true belief</i>	anti-classical <i>justified belief</i>
J-policy	$\langle J_{int} \rangle$	
justification	internalism about justification <i>requires introspective access to justification</i>	
T-policy	$\langle T_{real} \rangle$	$\langle T_{non} \rangle$
truth	realism about truth <i>truth is ‘out there’</i>	non-realism <i>truth is theory-relative</i>
I-policy	$\langle I_{obj} \rangle$	$\langle I_{subj} \rangle$
investigative position	objective <i>mind-independent research objects</i>	subjective <i>mind-dependent research objects</i>

I will use the labels Science and Arts respectively as placeholders for these bundles of epistemic policy elements when comparing inter- and intra-disciplinary epistemological variation. These archetypes represent epistemological “polar

tendencies” at different levels of social organization, not a monolithic classification of all members of that discipline or subdiscipline. For example, within a discipline such as linguistics, we find formal linguists who adopt the Science policy bundle for writing research articles, but who may at times follow “hunches” in the absence of an explicit justificatory account of their knowledge claims $\langle J_{\text{ext}} \rangle$. When publishing their results in research articles, however, they must justify their knowledge claims $\langle J_{\text{int}} \rangle$. Also within the discipline of linguistics, we find sociolinguists who adopt Science policy while gathering and analysing quantitative data, but then may apply Arts policy to interpret the results. Linguistic anthropologists might make even more restricted use of Science policy.

I suggest, then, that epistemological difference patterns recursively. This means that any particular academic discipline instantiates within it the same kind of epistemological polarization that obtains in wider academia taken as a whole. The epistemological difference between Arts and Science found at the largest scale of academia, say between physics and literary criticism, is also recapitulated within a single discipline. “Hub disciplines” such as psychology, linguistics or geography, whose members collaborate with those of several other disciplines, contain quite clear Arts and Science sub-disciplinary areas. I argue that this recursive epistemological differentiation produces, and is produced by, the taking of *epistemic stance*. Epistemic stance is a position about the status of a proposition as knowledge. It is materialized by drawing on linguistic resources already imbued with evidential meaning, either in virtue of their semantic content, or because they index the epistemic practices of others. By taking a stance, then, a speaker reproduces the indexical links between evidential language and epistemic

policy (see Chapter 2). In this chapter I explore the linguistic evidence for recursive epistemological differentiation in the academy.

In the next section I detail the structure of my corpora, and I explain how they were categorized in terms of their epistemic policies. In Section 3.2 I describe the variables investigated in this chapter. I then present and analyse the results of these corpus experiments in Section 3.3.

3.1 Corpus structure

Three corpora of written Academic English were formed from research articles which were chosen as representative of the epistemological diversity at different levels of social organization in academia. The largest level is represented in the “Two Cultures” corpus (TCC), which contains articles from the journals *Science* and *Nature* on the one hand, and *Tamara Journal for Critical Organization Inquiry* (formerly *Tamara Journal of Postmodern Critical Organization Science*) and *New Left Review (NLR)* on the other. I argue below that the TCC is representative of the Arts and Science epistemological archetypes. *Science* and *Nature* place a strong emphasis on innovation, and they publish papers from a very wide range of disciplines, albeit ones that are epistemologically compatible within their narrow EPR. These journals are also international. In short, they are narrow in epistemology, but wide in reach. In contrast, the *NLR* and *Tamara* are wide in epistemology, but narrow in reach. Although in principle both journals accept international contributions from a range of disciplines, in practice, the number of submissions and the readership is very small compared to that of

Science and *Nature*. I suggest that these differences, rather than being confounding factors, are features of the social organization of narrow and wide EPR.

A smaller, disciplinary level of organization was represented by four psychology journals in the psychology corpus (PsyC), and a sub-disciplinary level was represented in a similar manner in the sociolinguistic corpus (SLC). I argue below that these two corpora also instantiate the same kind of epistemological differentiation as the TCC. In the rest of this section I provide further details about the composition of each of the three corpora, and I describe how the epistemological character of these journals was assessed.

10 research articles published in 2009-10 were downloaded in PDF format from the on-line archives of each journal. Additional articles were included if total word counts were low, or to ensure a better representation of topics within that group. These articles were converted to TXT format using Microsoft Wordpad so as to be readable by the concordancing software used (AntConc 3.2.1w). The mission statement or equivalent for each journal is given below in this section, taken from the journals' websites (all accessed March 2014, although no substantive changes to mission statements had occurred in the elapsed time). The structure of the TCC is shown in Table 3.2.

Table 3.2 Structure of the Two Cultures corpus (TCC)

<i>Epistemological archetype</i>	<i>Journal</i>	<i>Articles</i>	<i>Words</i>
<i>Science</i>	Science	13	42771
	Nature	10	64551
<i>Arts</i>	New Left Review	10	58513
	Tamara	14	87451
<i>TOTAL</i>		47	253286

I argue that these four journals are representative of the epistemological archetypes Arts and Science. The journal *Science* is concerned with papers that ‘significantly advance scientific understanding’ through ‘novel and broadly important data’, as demonstrated in its mission statement:

Science's Mission: *Science* seeks to publish those papers that are most influential in their fields or across fields and that will significantly advance scientific understanding. Selected papers should present novel and broadly important data, syntheses, or concepts. They should merit the recognition by the scientific community and general public provided by publication in *Science*, beyond that provided by specialty journals.

We welcome submissions from all fields of science and from any source. We are committed to the prompt evaluation and publication of submitted papers. *Science* is published weekly; selected papers are published online ahead of print.⁴⁹

The journal *Nature* seeks ‘to serve scientists’ by publishing ‘significant advances’.

Nature's mission statement

First, to serve scientists through prompt publication of significant advances in any branch of science, and to provide a forum for the reporting and discussion of news and issues concerning science. Second, to ensure that the results of science are rapidly disseminated to the public throughout the world, in a fashion that conveys their significance for knowledge, culture and daily life.⁵⁰

⁴⁹ http://www.sciencemag.org/site/feature/contribinfo/prep/gen_info.xhtml

⁵⁰ <http://www.nature.com/nature/about/index.html>

Both journals thus set themselves up as bastions of Science, seeking to maintain a common base of important knowledge among scientists. Both journals also aim to project this common knowledge base to the public. Both journals appear to assume that Science, ‘scientific understanding’ and ‘scientific community’ are unproblematic monolithic concepts. They assume that knowledge is possible $\langle S+ \rangle$, consensual, and generally transmissible, implying realism about truth $\langle T_{\text{real}} \rangle$. In addition to the repeated references to Science, the epistemic policy elements suggested by the content of the mission statements make this pair of journals strong candidates for representing the Science epistemic archetype.

I argue that the next pair of journals are equally strong candidates for the Arts archetype. The mission statement of *Tamara Journal for Critical Organization Inquiry* makes frequent references to branches of critical theory:

Tamara Journal draws on Critical Management Theory and Postmodern Organization Science and is based in story/narrative and other qualitative study. It combines critical theory as well as postmodern theory and postcolonial theory and critical pedagogy with praxis. And one that seeks a higher ethics of global production and consumption.⁵¹

Critical theory is a diverse set of approaches to research which aims at emancipation of humanity from enslavement (Bohman 2013). This includes enslavement by prevailing ideologies, including e.g. the classical analysis of knowledge (see e.g. Foucault 1972). Given the range of critical positions mentioned in the mission statement, a position of non-realism about truth seems likely $\langle T_{\text{non}} \rangle$. Elsewhere on *Tamara*’s website, the following text supports this

⁵¹ <http://crow.kozminski.edu.pl/journal/index.php/tamara/about>

analysis in its description of how the picture at the top of the website illustrates the mission of the journal.

Our website design

The symbolics of our design emphasizes being on the side of the oppressed.

By using the famous picture of **Albert Einstein showing his tongue**, we claim our academic ambitions, while challenging the established norms. **Trotsky** symbolizes our critical component. **Andromeda in shackles** by Tamara Lempicka is an allegory of sympathizing with the underprivileged and feminism, while referring to the name of the journal (more on Tamara Lempicka below). It depicts Andromeda and represents social oppression (after all, Andromeda, powerful as she is, has been sacrificed to a sea monster). The painting is a classic/icon in feminist art and is one of the first pieces emphasizing women power. Using a graffiti painting by **Banksy** underlines the creative anarchy we work in, but also pacifism.⁵²

Both *Tamara* and *New Left Review (NLR)* distance themselves from the hegemonic epistemology of the academy, suggesting that epistemic policies other than the two archetypes might be possible in their articles. (Recall from Chapter 1 that I proposed that the prevailing academic norm of providing explicit justification in research $\langle J_{\text{int}} \rangle$ reduces the number of possible combinations of policy elements to the two “stable” archetypes). *Tamara* says ‘we claim our academic ambitions, while challenging the established norms’, while *NLR* makes an even stronger statement that it is ‘not an academic publication’. However, this is clearly meant in the anti-establishment rather than the anti-intellectual sense since it routinely publishes the essays of critical theorists, and the ‘prose models’ it offers are noted anti-classical thinkers:

⁵² <http://crow.kozminski.edu.pl/journal/index.php/tamara/about/editorialPolicies#sectionPolicies>

New Left Review welcomes the submission of articles, comments and book reviews on all the major issues facing us today. Authors should bear in mind that NLR is a journal of ideas, not an academic publication: lively, intelligent and thoughtful writing is highly valued—prose models would be Benjamin, Bloch or Marx rather than the average conference paper—and articles should be submitted with an educated and discerning general readership in mind.⁵³

These four journals, then, seem to be representative of the two epistemological archetypes introduced in Chapter 1 and reviewed above. *Tamara* and *NLR* profess to set themselves apart from the academy, and therefore suggest that their articles may be able to instantiate ‘unstable’ combinations of epistemic policy elements (e.g. by violating the law of non-contradiction).

In both of the remaining corpora, one journal represents each epistemological archetype, and two journals represent a “mixed” position that seems to tolerate both archetypal positions to some extent. The structure of the psychology corpus is shown in Table 3.3.

Table 3.3 Structure of the psychology corpus (PsyC)

<i>Epistemological archetype</i>	<i>Journal</i>	<i>Articles</i>	<i>Words</i>
<i>Science</i>	Experimental Psychology	10	71547
<i>Mixed</i>	British Journal of Psychology	10	88680
	British Journal of Social Psychology	10	131198
<i>Arts</i>	Feminism and Psychology	10	94797
<i>TOTAL</i>		40	386222

Experimental Psychology states on its website that its scope is ‘defined by the experimental method’. This method implies that knowledge is possible $\langle S+ \rangle$, and

⁵³ http://newleftreview.org/submission_guidelines

it also implies an investigative policy of objectivism $\langle I_{\text{obj}} \rangle$. Furthermore, like *Science* and *Nature*, this journal refers to an unproblematic ‘exchange of information’, suggesting realism about truth $\langle T_{\text{real}} \rangle$.

The Aims and Scope

As its name implies, *Experimental Psychology* (ISSN 1618-3169) publishes innovative, original, high-quality experimental research in psychology —quickly! It aims to provide a particularly fast outlet for such research, relying heavily on electronic exchange of information which begins with the electronic submission of manuscripts, and continues throughout the entire review and production process. The scope of the journal is defined by the experimental method, and so papers based on experiments from all areas of psychology are published. In addition to research articles, *Experimental Psychology* includes occasional theoretical and review articles.⁵⁴

The next two journals also publish research in a wider variety of specialisms in psychology, but without the proviso of experimental methods. The *British Journal of Psychology* (*BJP*) makes repeated reference to its preference for research that transcends disciplinary boundaries, including taking ‘contrasting methodological or theoretical approaches to a single topic’. This seems to state that a range of epistemic policies is tolerated in principle. Furthermore, *BJP* publishes articles on the history of psychology as well as empirical studies. It is not clear what is meant by the ‘critical’ in ‘critical reviews of the literature’, but, in the absence of any reference to critical theory *per se*, the overall outlook of *BJP* appears to align more towards the Science archetype than the Arts.

⁵⁴ <http://www.hogrefe.com/periodicals/experimental-psychology/about-the-journal-the-editors/>

3.1.1.1 *Aims and Scope*

The *British Journal of Psychology* (BJP) publishes original research on all aspects of general psychology including cognition; health and clinical psychology; developmental, social and occupational psychology.

We attract a large number of international submissions each year which make major contributions across the range of psychology, particularly where the work has the following characteristics:

- articles or groups of articles dealing with topics which are of interest to researchers from more than one specialism;
- section of psychology or which address topics or issues at the interface between different specialisms or sections of psychology;
- articles or groups of articles which take different or contrasting methodological or theoretical approaches to a single topic;
- articles or groups of articles dealing with novel areas, theories or methodologies;
- integrative reviews, particularly where the review offers new analysis (e.g. meta-analysis), new theory or new implications for practice;
- articles or groups of articles dealing with the history of psychology;
- inter-disciplinary work, where the contribution from, or to, psychological theory or practice is clear.

It enjoys a wide international readership and features reports of empirical studies, critical reviews of the literature and theoretical contributions which aim to further our understanding of psychology.

The journal additionally publishes a small number of invited articles by people who lead their field on a topic that provokes discussion. These articles include a short peer commentary.⁵⁵

The British Journal of Social Psychology (BJSP) also caters to a wide variety of specialisms, including ‘language and discourse’, welcoming ‘both qualitative and quantitative methods’. Like BJP, BJSP wants research that is ‘relevant to a wide range’ of researchers in that discipline, which points to realism about truth $\langle T_{\text{real}} \rangle$. This pair of journals appear to depart somewhat from the Science archetype in their scope, e.g. by the explicit mention of ‘discourse’ as a research object, which can suggest skepticism about knowledge and non-realism about truth $\langle S_o, T_{\text{non}} \rangle$, although both journals are quite muted about the Arts side (cf. e.g. the mission statement of *Tamara* above).

⁵⁵ [http://onlinelibrary.wiley.com/journal/10.1111/\(ISSN\)2044-8295/homepage/ProductInformation.html](http://onlinelibrary.wiley.com/journal/10.1111/(ISSN)2044-8295/homepage/ProductInformation.html)

3.1.1.2 *Author Guidelines*

The *British Journal of Social Psychology* publishes original papers in all areas of social psychology. Topics covered include social cognition, attitudes, group processes, social influence, intergroup relations, self and identity, nonverbal communication, and social psychological aspects of personality, affect and emotion, and language and discourse. Submissions addressing these topics from a variety of approaches and methods, both quantitative and qualitative are welcomed.⁵⁶

3.1.1.3 *Aims and Scope*

We publish papers of the following kinds:

- empirical papers that address theoretical issues;
- theoretical papers, including analyses of existing social psychological theories and presentations of theoretical innovations, extensions, or integrations;
- review papers that provide an evaluation of work within a given area of social psychology and that present proposals for further research in that area;
- methodological papers concerning issues that are particularly relevant to a wide range of social psychologists;
- brief reports that can include research studies or theoretical contributions;
- an invited agenda article as the first article in the first part of every volume.⁵⁷

The final psychology journal is *Feminism & Psychology (F&P)* which concerns itself with feminist theory ‘in and beyond psychology’. It intends its published articles to cross the ‘academic/applied ‘divide’’, which is a similar integrative intent to the two Mixed psychology journals. However, psychology is subordinated to feminist theory in the mission statement of this journal, and there is also an expression of an emancipatory aim to represent ‘a range of feminist voices including those under-represented in psychology journals’. The suggestion of this aim is that those voices will contribute unique perspectives in virtue of

⁵⁶ <http://onlinelibrary.wiley.com/journal/10.1111/%28ISSN%292044-8309/homepage/ForAuthors.html>

⁵⁷ [http://onlinelibrary.wiley.com/journal/10.1111/\(ISSN\)2044-8309/homepage/ProductInformation.html](http://onlinelibrary.wiley.com/journal/10.1111/(ISSN)2044-8309/homepage/ProductInformation.html)

their social characteristics, their lived experiences, their subjectivities. This points to non-realism about truth $\langle T_{\text{non}} \rangle$, and a subjective investigative perspective $\langle I_{\text{subj}} \rangle$.

F&P thus appears to align with the Arts epistemological archetype.

Feminism & Psychology is an international peer reviewed journal that provides a forum for debate at the interface between feminism and psychology. The journal's principal aim is to foster the development of feminist theory and practice in and beyond psychology. It publishes high-quality original research, theoretical articles, and commentaries.⁵⁸

Feminism and Psychology offers an intellectually and politically charged archive of historic and contemporary lines of analysis within feminism and psychology, across continents.

"I can't imagine writing an article – or teaching a course -- within psychology, or feminism, without immersing myself in the *F & P* index for the most provocative thinking on the topic. *F & P* is the perfect graduation gift for young feminist scholars who are beginning – or completing – doctoral work; it offers, at once, an orientation to our delicious conversations about theory, method and politics, and a textual pajama party among transnational feminists engaged in psychological work. Whether I am teaching a course on the history of psychology, gender, sexuality or methods, *F& P* is where I turn first to search for articles and to track contemporary lines of argument, analysis and feminist vision. It's my guide, my conscience and my intellectual/political 'stimulant'." *Michelle Fine*

Feminism & Psychology fosters the development of feminist theory and practice in psychology and represents the concerns of women in a wide range of contexts across the academic/applied 'divide'.

Cutting-Edge Feminist Research and Debate

Feminism & Psychology has established itself as the leading international forum for cutting-edge feminist research and debate in - and beyond - psychology. The journal fosters the development of feminist theory and practice in psychology by publishing:

- A range of high-quality theoretical and empirical papers
- Dialogue, debate and commentary at the interface of feminism and psychology
- Articles integrating research, practice and broader social concerns
- Papers spanning the academic-practitioner 'divide' and representing a range of feminist voices including those under-represented in psychology journals⁵⁹

⁵⁸ <http://www.sagepub.com/journals/Journal200868/manuscriptSubmission#tabview=manuscriptSubmission>

⁵⁹ <http://www.sagepub.com/journals/Journal200868/manuscriptSubmission#tabview=title>

The last of the three corpora is the sociolinguistics corpus, whose structure is shown in Table 3.4.

Table 3.4 Structure of the sociolinguistics corpus (SLC)

<i>Epistemological archetype</i>	<i>Journal</i>	<i>Articles</i>	<i>Words</i>
<i>Science</i>	Language Variation and Change	15	119323
<i>Mixed</i>	Journal of Sociolinguistics	10	110673
	Language in Society	10	121478
<i>Arts</i>	Journal of Linguistic Anthropology	10	123864
<i>TOTAL</i>		45	475338

Language Variation and Change (LVC) focuses ‘exclusively’ on variationist sociolinguistics, which it defines in terms of the impact of culture and society on ‘the structures and processes of traditional linguistics’. The research object is ‘linguistic structure’, which resonates with formal linguistics, but the context is ‘actual speech production and processing’. The word ‘actual’ is suggestive of realism about truth $\langle T_{\text{real}} \rangle$. LVC is edited by William Labov, who, as we saw in Chapter 2, was a pioneer of classical variationism, i.e. positivistic, structuralist sociolinguistics. All this points towards a Science epistemological archetype:

Language Variation and Change is the only journal dedicated exclusively to the study of linguistic variation and the capacity to deal with systematic and inherent variation in synchronic and diachronic linguistics. Sociolinguistics involves analysing the interaction of language, culture and society; the more specific study of variation is concerned with the impact of this interaction on the structures and processes of traditional linguistics. *Language Variation and Change* concentrates on the details of linguistic structure in actual speech production and processing (or writing), including contemporary or historical sources.⁶⁰

⁶⁰ <http://journals.cambridge.org/action/displayJournal?jid=LVC>

The Journal of Sociolinguistics (JSocio) has a wider scope than *LVC*, aiming to be both ‘thoroughly linguistic and thoroughly social-scientific’. In its mission statement, *JSocio* also describes itself as a ‘multidisciplinary’ forum, where language can be approached as formal features, abstract discourses or situated talk. In the review of the sociolinguistics of style in Chapter 2, we saw that concern with the situated character of talk is associated more with linguistic anthropological research than with classical variationism. *JSocio* thus appears to represent both Science and Arts epistemological archetypes.

3.1.1.4 *Overview*

Now publishing 5 issues per volume, *Journal of Sociolinguistics* has established itself as an international forum for multidisciplinary research on language and society.

Journal of Sociolinguistics promotes sociolinguistics as a thoroughly linguistic and thoroughly social-scientific endeavour. The journal is concerned with language in all its dimensions, macro and micro, as formal features or abstract discourses, as situated talk or written text. Data in published articles represent a wide range of languages, regions and situations - from Alune to Xhosa, from Cameroun to Canada, from bulletin boards to dating ads.

3.1.1.5 *Aims and Scope*

- The journal publishes occasional thematic issues on new topics of wide relevance to sociolinguistics, such as ‘Styling the Other’ (1999, edited by Ben Rampton) and ‘Non-standard orthography and non-standard speech’ (2000, edited by Alexandra Jaffe).
- We publish and encourage articles that build or critique sociolinguistic theory, and the application of recent social theory to language data and issues.
- The journal's Dialogue section carries opinion pieces and exchanges between scholars on topical issues, including Jan Blommaert, Tove Skutnabb-Kangas and Robert Phillipson on sociolinguistics and linguistic human rights.⁶¹

⁶¹ [http://onlinelibrary.wiley.com/journal/10.1111/\(ISSN\)1467-9841/homepage/ProductInformation.html](http://onlinelibrary.wiley.com/journal/10.1111/(ISSN)1467-9841/homepage/ProductInformation.html)

Language in Society (LiS) explicitly mentions both sociolinguistics and linguistic anthropology as part of its remit. *LiS* aims to strengthen ‘inter-disciplinary conversation’, but also to transmit information ‘of general interest’. This suggests both that knowledge may be being viewed as both linguistically constructed interaction, and as universal, apparently representing both Science and Arts epistemological archetypes as did *JSocio*.

Language in Society is an international journal of sociolinguistics concerned with language and discourse as aspects of social life. The journal publishes empirical articles of general theoretical, comparative or methodological interest to students and scholars in sociolinguistics, linguistic anthropology, and related fields. *Language in Society* aims to strengthen international scholarship and inter-disciplinary conversation and cooperation among researchers interested in language and society by publishing work of high quality which speaks to a wide audience. In addition to original articles, the journal publishes reviews and notices of the latest important books in the field as well as occasional theme and discussion sections.⁶²

The Journal of Linguistic Anthropology (JLA) represents a plurality of linguistic constructionist approaches to the study of language, and I suggest therefore that it aligns with the Arts epistemological archetype.

3.1.1.6 Overview

The *Journal of Linguistic Anthropology* explores the many ways in which language shapes social life. Published in the journal’s pages are articles on the anthropological study of language, including analysis of discourse, language in society, language and cognition, and language acquisition and socialization. The *Journal of Linguistic Anthropology* is published three times per year.

I have argued in this section that the three corpora of research articles together represent the recursive epistemological structure of academia. The TCC contains articles from two journals representing the Arts, and two journals representing

⁶² <http://journals.cambridge.org/action/displayJournal?jid=LSY>

Science. Within both the sociolinguistics (SLC) and psychology (PsyC) corpora, this distinction is recapitulated with two journals representing the epistemological archetypes, and two journals of intermediate character. In other words, the epistemological difference found at larger scales resembles that at smaller scales. This parallelism is represented in Table 3.5.

Table 3.5 Summary of the epistemological character of journals

	Arts $\langle S_o, K_{JB}, J_{int}, T_{non}, I_{subj} \rangle$		Science $\langle S_+, K_{JTB}, J_{int}, T_{real}, I_{obj} \rangle$	
TCC	Tamara, NLR		Science, Nature	
PsyC	F&P	BJSP, BJP	ExP	
SLC	JLA	LiS, JSocio	LVC	

If epistemological difference is indexed by linguistic difference as argued here (after Irvine and Gal 2000), and if the same linguistic features are used to index the epistemological position at inter- and intra-disciplinary levels, then whatever patterns of linguistic differentiation are observed in TCC should recur in PsyC and SLC. This and subsequent predictions are summarized before the results section, below.

In the next section I explain which variables I have considered that could potentially account for variation, and I will describe the linguistic variables investigated in the present chapter.

3.2 Variables

I said at the start of this chapter that I aim here to evaluate whether the relationship between language and epistemology is amenable to quantitative

sociolinguistic analysis by answering the question: is there in fact quantitative evidence of linguistic variation according to epistemological commitments? I now clarify the variables to be examined in this exploratory study.

3.2.1 Epistemic policy

I have used the terms Science and Arts to stand for epistemological archetypes. These are the clusters of epistemic policy elements that I argue are stable in the context of academia where norms of e.g. non-contradiction, and explicit justification of knowledge claims, tend to make certain epistemic policy element combinations untenable (see Chapter 1). While individuals will have access to a range of epistemic policies which they apply to different situations, when it comes to presenting that research in a peer-reviewed journal, I claim that the Science and Arts policy bundles are the only options in the academy. We saw above that *NLR* and *Tamara* distanced themselves from the academy, and I argue that this makes their writers more likely to adopt policy clusters that would be unstable within the academic system. Thus we have a two-fold distinction between Arts and Science. One is that some of their epistemic policy elements take different forms:

Science $\langle S^+, K_{JTB}, J_{int}, T_{real}, I_{obj} \rangle$

and

Arts $\langle S_o, K_{JB}, J_{int}, T_{non}, I_{subj} \rangle$

The second point of difference is that Arts disciplines may, to a greater or lesser extent, “hold the academy at arm’s length”. In other words, scholars who use the Arts epistemic policy bundle, being aware of the institutional pressures on those epistemological commitments, partially reject that institution, while also still engaging with it by having departments in universities, publishing research articles etc. These Arts scholars are therefore more able to access a wider range of epistemic policies than if they fully subscribed to institutional norms in the academy. In contrast, scholars who use the Science policy bundle either lack this reflexive sensibility, or they do not allow it to question their epistemic commitments in this radical way. Rather, they tend to access a relatively narrow range of epistemic policies (*epistemic policy range* is abbreviated to EPR):

Science	$\langle S+, K_{JTB}, J_{int}, T_{real}, I_{obj} \rangle$	Narrow EPR
Arts	$\langle S_o, K_{JB}, J_{int}, T_{non}, I_{subj} \rangle$	Wide EPR

In this thesis I describe epistemological variation in terms of epistemic policy and EPR. In this chapter, I operationalize the archetypal epistemic policies as journal of publication (see Table 3.5 above), and then I look at the related linguistic variation. I am thus examining variation at the inter-disciplinary (TCC) and intra-disciplinary levels (PsyC, SLC).

3.2.2 Other external variables

Sociodemographic variables such as *sex*, *nation* (of institutional affiliation) and *age* of author were not examined since the low number of authors (10 per

journal), combined with the distorting effect of editing and peer review, would render inferences about these variables in general highly problematic. There was some indication that the number of authors had a small effect on modal verb use, but this variable was eliminated from this analysis so as to be more fully explored in future work via a study better suited to capturing intersubjective stance construction.

Article subsection (e.g. abstract, conclusion, etc) was not considered as a variable here. Swales (1990) argues that article subsections are different enough from one another in their communicative purpose to constitute separate *genres*. This suggests that, in a whole-article comparison, the discipline-specific patterns under investigation here would be obscured by the stylistic variation between article sections common to all disciplines. However, Swales also notes that it is not clear that the various subsections of articles (e.g. abstract, discussion) constitute the same genres in different disciplines (e.g. a lecture on physics has quite different expectations and communicative purposes from a lecture on literary criticism). Furthermore, an article in e.g. *LVC* has well-delimited sections with titles such as “variables” and “results”, which are not found in journals such as *Tamara* or *NLR*. Even in the small number of cases where a common structural element can be identified, then, such as “introduction”, a comparison across epistemologically disparate journals would challenge the validity of this category. I therefore compare whole articles. While this is a coarse-grained approach, I suggest that it is analytically no less valid than a section-by-section comparison for comparisons across very divergent disciplines.

A further consideration is the size of the audience of the journal. A wide readership, such as that of *Science* or *Nature*, could encourage a style of writing that promotes the disciplinary ideals to a more self-conscious (or editorially engineered) degree than some of the more esoteric journals of smaller readership. A smaller readership might lend itself to practices of “preaching to the choir”, i.e. a drift of style towards a looser or more radical epistemological standpoint than would be admissible to mainstream disciplinary standards. Conversely, an explicit statement of epistemological commitments might be less necessary in a journal of smaller readership since such commitments may already be understood through other channels. In addition, as discussed in Chapter 2, discourse communities of different sizes have qualitatively different mechanisms for critical interaction among themselves (Swales 1990). Science is a relatively homogeneous and populous discourse community, whereas Arts is a composite of heterogeneous and smaller discourse communities. The difference in size of audience, then, rather than being a variable to be controlled or examined separately, may be considered as a feature of relative epistemological homogeneity, rather than a variable which is orthogonal to epistemological commitments.

Though the variables discussed in this section are of interest and importance to sociolinguistic and AE research, they are of limited validity in the context of the present study which looks at relatively small numbers of texts across a spectrum of genres edited by relatively few people. The articles considered will however be able to address the research questions at hand. Furthermore, the inclusion of vast numbers of predictor variables risks

invalidating the results of statistical analysis, even where a cross-tabulation could be adequately populated by including more tokens.

3.2.3 Dependent variables

As reviewed in Chapter 2, modality is of central importance in the linguistic materialization of epistemic stance, because modal language conveys how certain you are about what you are saying. For this reason, I look at *modal verbs* and *modal adverbs* in this chapter. I also look at a class of verbs that seems particularly pertinent in the construction of epistemological difference: *evidential verbs*. Evidential verbs (e.g. *demonstrate*, *prove*, *argue*, *claim*) convey how you conceive of, and justify, the knowledge claim you are making. Is it the claim about a situation “out there” in the world for all to see, or is it a discursively constructed object whose “reality” is mind-dependent? In this section I explain how these verbs are analysed as linguistic variables whose variants are predicted to depend on epistemic policy.

I focus in the present chapter on the linguistic materialization of three epistemic policy elements: S-policy, K-policy and I-policy. J-policy is likely to be difficult to analyse via corpus analysis since it would likely require carefully contrived questioning as seen in the discussion of ‘Truetemp cases’ in Chapter 1. Furthermore, externalism about justification $\langle J_{\text{ext}} \rangle$ is likely to be strongly disfavoured in research articles, as discussed above. It is possible that T-policy would correlate with plural marking, e.g. the acceptance of non-realism about about truth $\langle T_{\text{non}} \rangle$ implies the existence of multiple truths, while a realist would

only refer to *the* truth. However, such plural use is likely to be too infrequent for quantitative analysis.

Recall from Chapter 1 that K-policy relates to one's analysis of knowledge. I argued that academics in general assume that *believing* a proposition is a necessary criterion for *knowing* that proposition. They generally also require some form of *justification* for their claims to be considered as knowledge claims, although the acceptable forms of justification vary among the disciplines. Whether they believe that their claims have to be *true* in order to count as knowledge is a matter of dispute because the nature of truth is contested, leading to K-policies of $\langle K_{\text{JTB}} \rangle$ or $\langle K_{\text{JB}} \rangle$. While many academics might be too epistemically modest to claim to be discovering truths, the discursive treatment of truth in Science disciplines is quite different from Arts. In the former, discussion about the nature of truth is rare or absent, while in the Arts it is not uncommon to reflect on the nature of truth, whether implicitly or explicitly, for example via the Foucauldian notion of *truth regimes*. S-policy relates to skepticism, e.g. perhaps most relevantly here, *epistemism* $\langle S_+ \rangle$, the position that knowledge is *possible*, versus *Pyrrhonian skepticism* $\langle S_0 \rangle$, the position of non-committal to either the possibility or impossibility of knowledge. *I-policy* relates to the position of an investigator with respect to the object of their inquiry, i.e. whether objectivity is assumed $\langle I_{\text{obj}} \rangle$, or whether the research findings are considered to be necessarily relative to the investigator's subjectivity $\langle I_{\text{subj}} \rangle$.

As reviewed above, although the various knowledge policies could in principle give rise to many combinations of policy bundles, in practice, some

combinations are difficult to maintain under sustained interrogation of the sort that is routine in academia. The stable variants relevant in this section are:

Science $\langle S+, K_{JTB}, I_{obj} \rangle$

and

Arts $\langle S_o, K_{JB}, I_{subj} \rangle$

Below I explore some potential linguistic correlates of these variants of S-policy, K-policy and I-policy. A major focus here is on *modality* since this relates to the expression of certainty, which is central to the notion of epistemology. I suggest that one's beliefs about the possibility of certain knowledge (S-policy and K-policy) influence whether and when one expresses certainty about knowledge. Modal logic makes use of two primitive forms of modality, and I adopt this binary distinction since it is the most conservative modal classification (Huddleston and Pullum 2002; though cf. Holmes 1990; Kärkkäinen 2003):

$\Box p$ it is necessary that p “strong modality”

$\Diamond p$ it is possible that p “weak modality”

These two modal strengths can be applied to different *semantic frames* in order to capture more of the modal variation found in English, for example, the *epistemic frame* concerns the status of propositions as knowledge (i.e. propositions which *must* or *may* be true, given what is known), while the *deontic frame* concerns propositions as obligations or duties (i.e. propositions which *must* or *may* be

required by rules to be enacted). Although well established in the semantics literature (see e.g. Portner 2009: 11–24), frames such as *epistemic* and *deontic* rather depend on one’s understanding of rules and obligations, and this is subject to variation depending on one’s individual epistemology. For example, a *syllogism* is a logical argument of the following form:

Major premise	All men are mortal.
Minor premise	Socrates is a man.
Conclusion	Socrates is mortal.

Syllogisms are examples of *deductive reasoning* where, if the premises are true, the conclusion *must* be true. However, the interpretation of *must* as epistemic or deontic is relative to one’s beliefs about the validity of deductive reasoning. The classical (K_{JTB}) interpretation of this definition of deductive reasoning would be that *must* here serves as a *nomic modal*, i.e. that it means that the truth of the conclusion is necessary *given the laws of logic*. One of the laws of logic is the law of non-contradiction. We saw earlier that this law is subject to dispute, although it is strongly preferred in the academy. An anti-classical interpretation, dispensing with the requirement of the absolute truth of knowledge, could reject the validity of deductive reasoning, and rather maintain that the word *must* here is a *deontic modal*, i.e. that the necessity of the truth of the conclusion is dependent on the *assumptions of classical logic*, which is not an absolute nomic requirement. In this

case then, *must* uses an arbitrary system of rules as its modal base⁶³, which are no more necessary than the social conventions or laws that, in other situations, give *must* a deontic interpretation to the classicist.

I have argued that what is classically known as epistemic modality is only distinct from other forms of modality *within a classical epistemology*. Since I am also examining epistemological positions that diverge from the classical, I argue that this distinction is not analytically valid across the epistemological range represented by my corpora. Even if it were valid, *epistemic* modality is likely to be the majority classical classification in academic writing: Piqué-Agordans *et al.* (2002) found that the proportions in their corpus of journals of literary criticism, biology and medicine were 88.33% epistemic and 11.67% deontic. I will not adopt an analytic distinction between modal flavours in this thesis; I return to this argument in Chapter 6.

My choice of which specific modal verbs to examine builds on Piqué-Agordans *et al.*, who chose the following modal verbs based on work by Quirk, Greenbaum, Leech and Svartvik (1985) and Downing and Locke (2002): *can*, *could*, *dare*, *may*, *might*, *must*, *need*, *ought*, *shall*, *should*, *will*, and *would*. I restrict my choice to the most common variants among these. I omit *dare*, *ought*, and *shall*, which were entirely absent from one or more of my corpora; and *need* which is conjugable and may thus not pattern with canonical modal verbs. I eliminate *could* and *can* too since they change their meanings asymmetrically when combined with *not*. What I mean by this is that, while *must not* and *will not*

⁶³ The modal base (Kratzer 1977) is the thing in view of which a modalized proposition is interpreted. For example, epistemic modality is interpreted *in view of what is known*, while deontic modality is interpreted *in view of the rules*.

are still *strong* modals, *cannot* and *could not* are scopally ambiguous between the following two readings:

$$\text{not}(\text{can}) \quad \neg\Diamond a = \Box\neg a$$

i.e. “it is not possible that *a*” is the same as “necessarily not *a*”, which is *strong* rather than weak. Contrast this with:

$$\text{can}(\text{not}) \quad \Diamond\neg a = \neg\Box a$$

i.e. “*a* is possibly not true” is the same as “it is *not* the case that *a* must be true”, in other words, *a* is only *possibly* true, which is still *weak*. I suggest that both readings are generally available for *cannot* and *could not*, although one or other may be more contextually likely in any particular case. However, the judgement of which one is the most likely intended reading depends not merely on contextual facts. It also depends on which facts are seen as relevant, i.e. it depends on the epistemic policy of the reader (and writer). *May not* also only receives a strong reading if it is taken in terms of permission, i.e. as a deontic modal, which I am assuming is a minority case (given Piqué-Angordans *et al.* 2002). I contend that *might not* is virtually impossible to read as a (strong) deontic modal in contemporary Standard English. Since the scopal ambiguity of *cannot* and *could not* means that interpretation is dependent on a presupposed epistemic policy, I eliminate cases of modal verbs with adjacent *not* from this analysis.

It is possible that the strength of these modal verbs could be modulated by adverbs (e.g. *possibly must*, or *certainly might*, both of whose complements would receive the opposite epistemic force reading from that of the modal verb). In fact, such collocations were rare in my corpora, with only 3 instances of a modal verb being immediately followed by a modal adverb.

Table 3.6 Coding distinctions for modal verbs

Strong (necessity)	<i>must, will</i>
Weak (possibility)	<i>may, might</i>

Will is commonly used to mark the future tense, and its optionality as a future marker is separate from its optionality as a marker of strong modal commitment. However, all modal verbs can convey futurity in addition to modality. In other words, while the verbs in Table 3.6 are etymologically diverse, I suggest that they are functionally differentiated only in the dimension of modal strength (see discussion in Chapter 2), which is in contrast to other excluded verbs such as *can* and *dare* which convey additional semantic content).

In addition to modal verbs, I also examined 4 adverbs with (epistemic) modal character, chosen from the small number of adverbs listed in Table 2.1 (Chapter 2, based on Biber *et al.* 1999). These adverbs may be classified as strong or weak in the same way as the modal verbs above. There were only 4 tokens of *definitely*, so this variant was omitted. *Likely* and *unlikely* were excluded because they are ambiguous between being adjectives and adverbs; and *perhaps* was

excluded because it is morphologically different from the rest of this class (i.e. it lacks the *ly* suffix). These linguistic considerations would have introduced potentially confounding factors. Eliminating these also made the sample of adverbs more balanced between the rarer strong forms and the more common weak forms.

Table 3.7 Coding distinctions for modal adverbs

Strong (necessity)	<i>certainly, necessarily</i>
Weak (possibility)	<i>possibly, probably</i>

Again, I suggest that these four forms, while etymologically heterogeneous, are functionally equivalent, and can therefore be considered variants of a single variable (see discussion in Chapter 2). Across all three corpora, 41 out of 89 tokens of *necessarily* occurred in *not necessarily*, and such cases were coded as weak (since $\neg\Box a = \Diamond a$). 2 out of 58 tokens of *possibly* occurred in *not possibly*, and were thus coded as strong ($\neg\Diamond a = \Box\neg a$). Adverbs followed by *not* do not appear to have their strength changed: ‘necessarily *not* a’ is still strong, and ‘possibly *not* a’ is still weak.

Finally, I investigate the linguistic correlate of I-policy (investigative position) by looking at *evidential verbs* with subjectivity or objectivity as part of their semantic content. *Alethic modality* relates to the truth of a proposition; its logical necessity or contingency, its possibility or impossibility, its truth or falsity. This kind of truth is taken to be objective, i.e. speaker-independent truth-in-the-

world. *Epistemic modality* on the other hand relates to the status of a proposition *as knowledge*, and thus relates a proposition to a mind, subjectively, as truth-in-the-mind. *Alethic* and *epistemic* modality is not distinguished via modal verbs, and their semantic distinction is a matter of dispute. Von Wright (1951) and Lyons (1977) suggest an analytic distinction between alethic and epistemic modality, although Nuyts (2000) notes that these modalities are not distinguished formally in English, or perhaps in any language. Cinque (1999) proposes that these forms are distinguished syntactically via functional projections, although this will not be examined here. A putative alethic/epistemic distinction will be explored by examining the distribution of lexical verbs related to the status and assertion of knowledge, i.e. *evidential* verbs in the broad sense (Chafe and Nichols 1986: 261).

Table 3.8 Coding distinctions for evidential verbs

Alethic (speaker-independent)	<i>demonstrate, prove, indicate, show</i>
Epistemic (speaker-dependent)	<i>think, believe, know, infer, expect, argue, claim</i>

Table 3.9 summarizes my predictions for these three variables, which I then explain below.

Table 3.9 Prediction summary

<i>Archetype</i>	<i>Policy elements</i>	<i>EPR</i>	<i>Modality</i>	<i>Evidential verbs</i>
Arts	$\langle S_o, K_{JB}, I_{subj} \rangle$	wide	strong > weak	epistemic > alethic
Science	$\langle S^+, K_{JTB}, I_{obj} \rangle$	narrow	weak > strong	alethic > epistemic

The epistemological archetypes are listed in Table 3.9 together with the epistemic policy elements relevant to the present discussion. Also given is the corresponding epistemic policy range (EPR) of each archetype. The two right-hand columns make predictions for the relative distributions of strong and weak modality (including verbal and adverbial), and for alethic and epistemic evidential verbs, which I discuss now in reverse order.

First, evidential verbs. In the case of Arts, where the prevailing I-policy is one of investigative subjectivism $\langle I_{\text{subj}} \rangle$, I predict that epistemic evidential verbs will be preferred over alethic evidential verbs. In other words, I predict that an I-policy that treats epistemic subjectivity as an irreducible aspect of knowledge claims will dispose speakers to frame their claims as knowledge rather than as truth, and that they will materialize this by preferring epistemic verbs over alethic ones. In the case of Science, I predict that the opposite pattern will obtain since the prevailing I-policy is investigative objectivism $\langle I_{\text{obj}} \rangle$. This I-policy considers knowledge claims not to be dependent on epistemic subjectivity, but rather to be mind-independent. I predict that this will dispose speakers to favour alethic evidential verbs over epistemic ones.

Lastly, modality. These predictions are based on K-policy and EPR. The K-policy of Arts $\langle K_{\text{JB}} \rangle$ is less stringent than that of Science $\langle K_{\text{JTB}} \rangle$. Furthermore, the Arts are relatively permissive in respect of the epistemic policies they tolerate, i.e. they have a relatively wide epistemic policy range (EPR) when compared to Science. On this basis, I predict that discourses and individuals who align with the Arts archetypal epistemic policy bundle will generally make stronger claims than those who align with Science. This is because their criteria for claiming certainty

are less strict. Conversely, the discourses of Science are predicted to sound relatively cautious by using a higher frequency of weaker modals than strong.

I have constructed three corpora to reflect the recursive pattern of epistemological differentiation that I argue is found in academia. Given this recursivity, I predict that the patterns described in Table 3.9 will be recapitulated in all three corpora to some extent. It is likely that the epistemological diversity of the Two Cultures corpus is greater than that of the two disciplinary corpora, and that the TCC will have a correspondingly more exaggerated pattern of variation.

3.3 Results

In this section I summarize the distributional properties of all three variables, and then interpret them in light of the predictions above. I first look at evidential verbs in Section 3.3.1, then modal verbs in Section 3.3.2 and finally modal adverbs in Section 3.3.3.

Pearson's χ^2 test of independence is performed on raw counts (i.e. numbers of words rather than frequencies) throughout to establish whether the relevant groups are statistically significantly likely to be independent of each other.⁶⁴ This is to lend quantitative support to the interpretation of patterns in the data in terms of epistemology by increasing confidence that those patterns would not be better explained as due to chance.

⁶⁴ Recall from the thesis outline that I am following Dines' (1980) recommendation to initially use a frequency-based analysis. Frequencies will be compared, and the significance of the differences between them will be tested on the raw count data (i.e. numbers of tokens). ANOVA testing—which is used in later chapters—would not be appropriate for testing these raw count data since only the total counts over multiple research articles were recorded.

I adopt the standard social sciences alpha level of 0.05. This means that if a χ^2 test returns a p -value of 0.05 or less, then that will count as a significant result. This means that, if the χ^2 test determines that there is only a 0.05 probability that the result was due to chance, then that will be judged as sufficiently unlikely to count as not being due to chance.

In some cases, multiple χ^2 tests are performed on the same data. This increases the risk of type I error. In other words, by testing the same data lots of times, one runs the risk of finding an apparently significant result by chance. To counter this possibility, the alpha level should be reduced during multiple comparisons. If 20 tests are performed on the same data, then alpha should get 20 times smaller. This is called Bonferroni correction (Dunn 1961). Most of my p -values are too small to be affected by Bonferroni correction, but where this is not the case, I have indicated that the alpha level should be adjusted down.

3.3.1 Evidential verbs

Recall that *alethic* evidential verbs present information as “mind-independent”, or in terms of objective reality, whereas *epistemic* evidential verbs present information as “mind-dependent”, or in terms of subjective knowledge (see Table 3.8 above).

Table 3.10 shows the numbers and frequencies *per mil* (‰) of evidential verbs in the three corpora. Each corpus is broken down according to the epistemological archetypes Science, Arts and “Mixed”, with the total word count

shown for each sub-corpus. The Two Cultures corpus does not contain any Mixed journals.

Table 3.10 Number and frequency (%) of evidential verbs

<i>Corpus</i>	<i>Division</i>	<i>Alethic</i>		<i>Epistemic</i>		<i>Total words</i>
		<i>N</i>	<i>(freq.)</i>	<i>N</i>	<i>(freq.)</i>	<i>in sub-corpus</i>
TCC	Science	456	(4.249)	56	(0.522)	107322
	Arts	108	(0.740)	367	(2.514)	145964
PsyC	Science	230	(3.215)	146	(2.041)	71547
	Mixed	496	(2.256)	620	(2.820)	219878
	Arts	49	(0.517)	116	(1.224)	94797
SLC	Science	372	(3.118)	264	(2.212)	119323
	Mixed	435	(1.874)	664	(2.860)	232151
	Arts	126	(1.017)	322	(2.600)	123864

The balance of alethic/evidential verbs is significantly different between Science and Arts. The difference is in the same direction as predicted, and it is regularly repeated in all three corpora. The following figures and discussion elucidate these findings further.

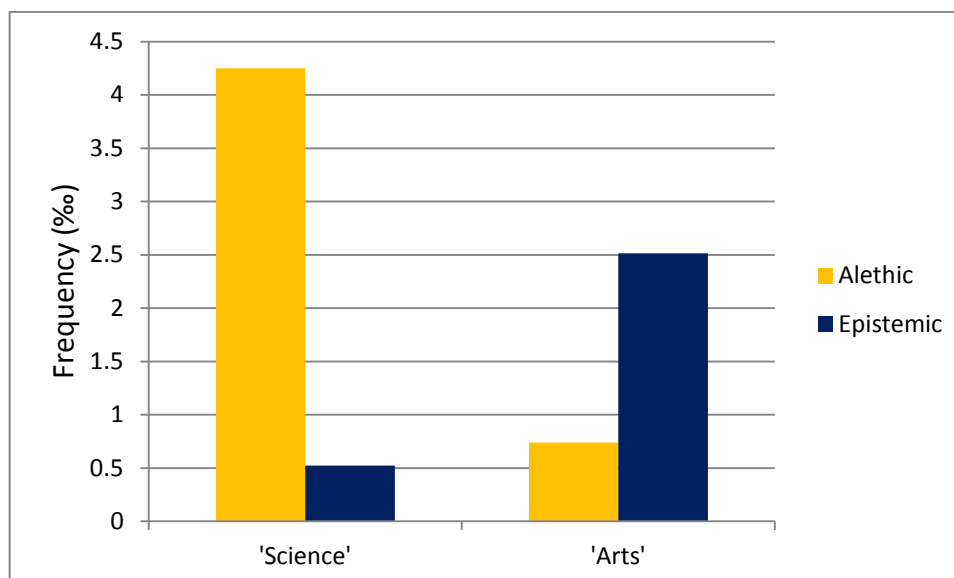


Figure 3.1 Frequency of evidential verbs in the TCC
 $(\chi^2 = 442.61; df = 1; p < 0.001)^{65}$

Figure 3.1 illustrates the frequency distribution in the Science and Arts journals of the TCC. Alethic verbs are about 8 times more frequent than epistemic verbs in Science journals. The opposite distribution obtains in Arts journals, where epistemic verbs are about 4 times more frequent than alethic verbs. These distributions agree qualitatively with prediction.

Figures 3.2 and 3.3 illustrate the balance of evidential verbs in the psychology corpus and the sociolinguistics corpus respectively. The Science and Arts journals within those corpora exhibit the same kind of pattern as those in the TCC. The Mixed journals follow the Arts pattern qualitatively, while they differ quantitatively.

⁶⁵ *p*-values below graphs refer to omnibus statistics for all data represented.

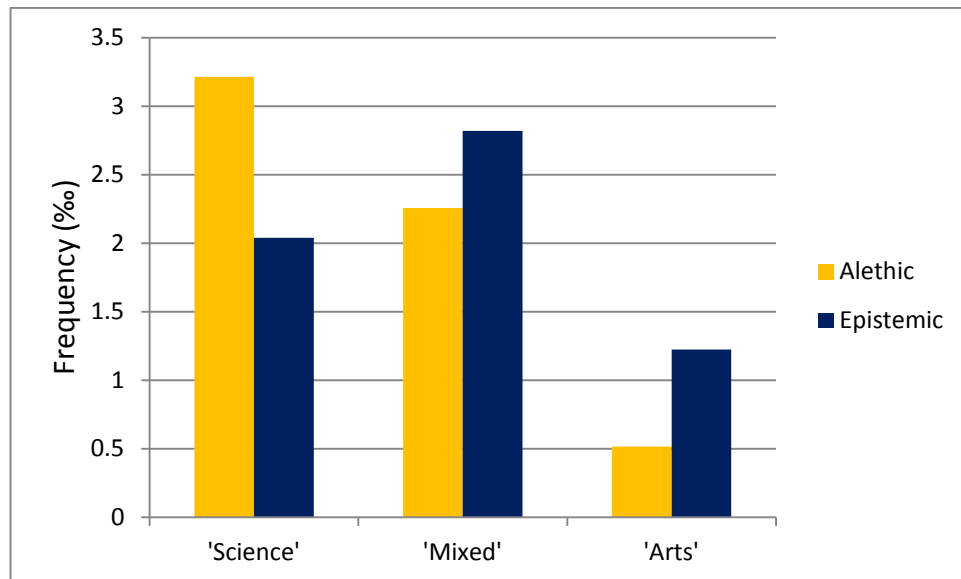


Figure 3.2 Frequency of evidential verbs in the PsyC
($\chi^2 = 53.06$; $df = 2$; $p < 0.001$)

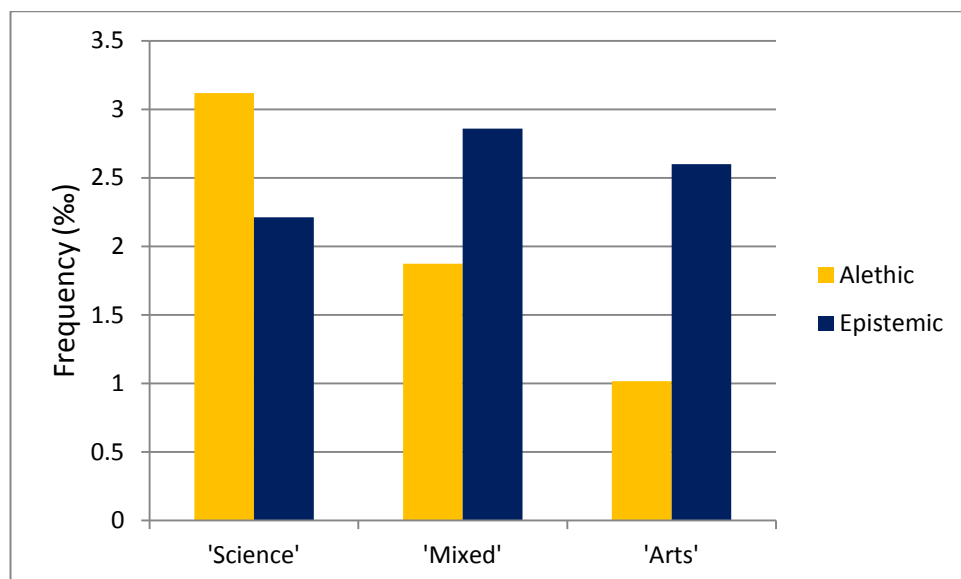


Figure 3.3 Frequency of evidential verbs in SLC
($\chi^2 = 108.05$; $df = 2$; $p < 0.001$)

Both the PsyC and SLC recapitulate the TCC pattern qualitatively, but to a smaller quantitative degree. Science journals use around 1.5 times more alethic verbs than epistemic verbs, while Arts journals use around twice as many

epistemic than alethic verbs. Pairwise comparisons between Science and Mixed, and between Mixed and Arts journals were all significant in both the PsyC and the SLC.⁶⁶

This means that the significant differentiation in TCC has been recursively instantiated in PsyC and SLC. The disciplinary level pattern is also significant, but quantitatively smaller. The similarity between the PsyC and SLC is remarkable. Both these corpora represent different disciplines, but they share virtually identical differentiation with respect to their use of evidential verbs. This is strong evidence that these verbs are linked to the epistemological differentiation on the basis of which the corpora were assembled.

The Mixed journals were described earlier as being tolerant of diverse approaches, but as being overall more scientific in character. The Mixed journals however appear to use their evidential verbs in a manner that qualitatively resembles the Arts, i.e. with more epistemic than alethic verbs, although the Mixed patterns are statistically significantly different from the Arts. I suggest then that tolerance of other epistemic policies may be a better predictor of evidential language use than the details of one's epistemic policy. In other words, I propose that the qualitative similarity between Arts and Mixed journals in the PsyC and SLC is due to their sharing a relatively wide epistemic policy range (EPR). The Science journals in contrast have relatively narrow EPR, which associate with a qualitatively different distribution of evidential verb use (alethic > epistemic). The

⁶⁶In the PsyC, Science differed significantly from Mixed ($\chi^2 = 31.49$; $df = 1$; $p < 0.001$), and Mixed from Arts ($\chi^2 = 12.79$; $df = 1$; $p < 0.001$). In the SLC, Science differed significantly from Mixed ($\chi^2 = 57.90$; $df = 1$; $p < 0.001$), and Mixed from Arts ($\chi^2 = 16.40$; $df = 1$; $p < 0.001$).

explanatory utility of EPR will be evaluated against the remaining results in this chapter, and also in Chapter 5.

3.3.2 Verbal modality

Recall that *modal* verbs were coded as weak (*may, might*) and strong (*will, must*).

Table 3.11 shows the numbers and frequencies *per mil* (‰) of modal verbs in the three corpora.

Table 3.11 Number and frequency (‰) of modal verbs

<i>Corpus</i>	<i>Division</i>	<i>Strong</i>		<i>Weak</i>		<i>Total words in sub-corpus</i>
		N	f	N	f	
TCC	Science	56	0.522	83	0.773	107322
	Arts	357	2.446	234	1.603	145964
PsyC	Science	69	0.964	113	1.579	71547
	Mixed	314	1.428	476	2.165	219878
	Arts	50	0.527	137	1.445	94797
SLC	Science	178	1.492	177	1.483	119323
	Mixed	271	1.167	340	1.465	232151
	Arts	174	1.405	132	1.066	123864

Figure 3.4 shows the distribution of strong and weak modal verbs in the TCC. The relative overall frequency of modal verbs in Arts and Science is quite divergent, with modal verbs being between 2 and 5 times more common in Arts articles. Again we find significant differentiation such that Science uses about 1.5 times more weak than strong modal verbs, and Arts uses about 1.5 times more strong than weak. These distributional differences agree qualitatively with prediction.

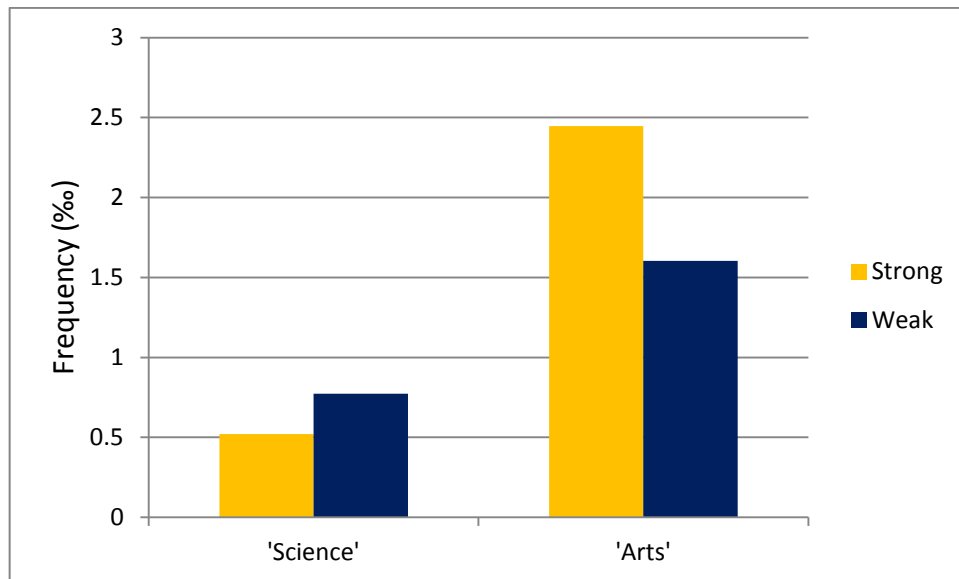


Figure 3.4 Frequency of modal verbs in the TCC
($\chi^2 = 18.54$; $df = 1$; $p < 0.001$)

Figures 3.5 and 3.6 show the distribution of modal verbs in the psychology corpus and the sociolinguistics corpus respectively. This time the TCC pattern is not recursively instantiated in the same striking manner as before. Pairwise comparisons show that Science and Mixed are not significantly different from one another in either the PsyC or the SLC, while Mixed and Arts are significantly differentiated in both.⁶⁷

In the PsyC, all journals follow the TCC's Science pattern (Figure 3.5). The Arts journal in PsyC uses about 3 times more weak than strong modal verbs, while the Science/Mixed journals use about 1.5 times more weak than strong. Overall then, these journals demonstrate epistemic caution, and it is the Arts

⁶⁷ In the PsyC, Science did not differ significantly from Mixed ($\chi^2 = 0.21$; $df = 1$; $p = 0.65$), however Mixed did differ significantly from Arts ($\chi^2 = 10.95$; $df = 1$; $p < 0.001$). In the SLC, Science did not differ significantly from Mixed ($\chi^2 = 3.02$; $df = 1$; $p = 0.082$), however Mixed did differ significantly from Arts ($\chi^2 = 12.77$; $df = 1$; $p < 0.001$).

journals that are particularly cautious. This runs counter to expectation. The behaviour of the Science journal articles however agrees with prediction.

The Mixed journals this time match the Science pattern rather than matching than the Arts as was the case for evidential verbs. This presents a challenge for the explanatory power of EPR suggested above. If the relatively wide EPR of the Mixed journals could indeed account for their similarity to the Arts journals in respect of their distributions of evidential verbs, then it is not clear how a wide EPR can also account for their similarity to the Science journals here.

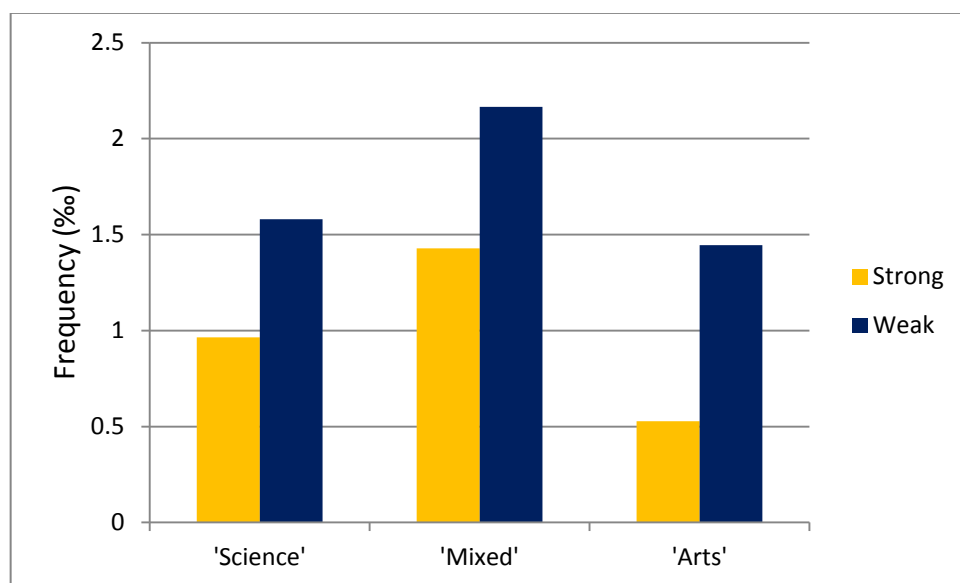


Figure 3.5 Frequency of modal verbs in the PsyC
($\chi^2 = 10.96$; $df = 2$; $p = 0.004$)

In the SLC, the Arts research articles follow the same qualitative pattern as the Arts journals of the TCC, but to a smaller degree (see Figure 3.6 below). This

time the frequency of weak modal verb use is about 1.3 times higher than that of weak. The Mixed journals follow the TCC's Science pattern, with around 1.3 times more weak than strong modals. This pattern is expected given the similarity in evidential verbs patterns of the Mixed and Science journals. The Science journals do not appear to be significantly differentiated with respect to modal verbs, although they did not differ significantly from the Mixed ones.

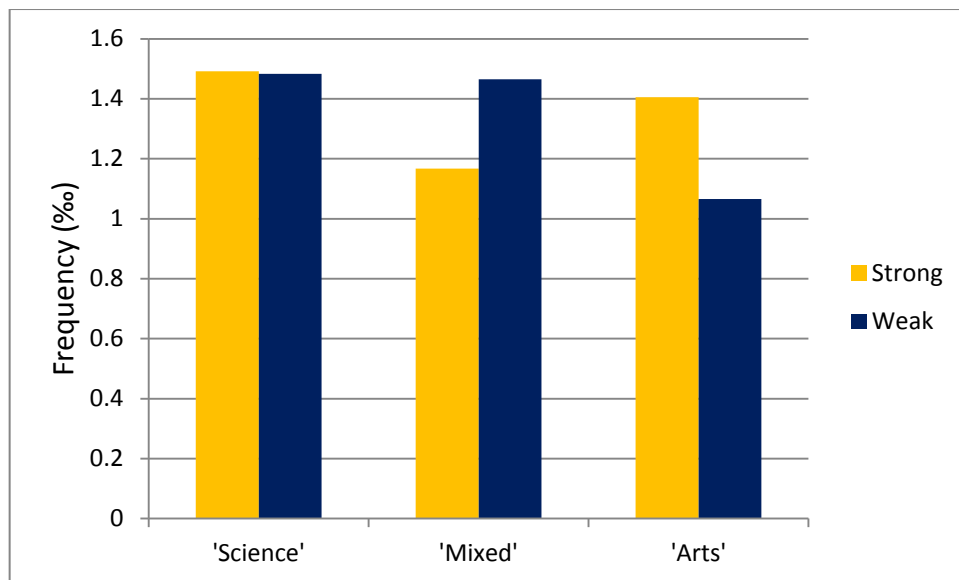


Figure 3.6 Frequency of modal verbs in SLC
($\chi^2 = 13.03$; $df = 2$; $p = 0.001$)

The picture for modal verbs is not as clear as it was for evidential verbs. TCC behaved as expected, with Science using more weak than strong, and Arts using more strong than weak modal verbs. However, only some aspects of this were recursively instantiated in the PsyC and SLC. This casts some doubt on the explanatory power of EPR as a predictor of evidential language behaviour.

3.3.3 Adverbial modality

Modal verbs were coded as weak (*possibly, probably*) and strong (*certainly, necessarily*), and Table 3.12 shows their distributions in the three corpora.

Table 3.12 Number and frequency (‰) of modal adverbs

<i>Corpus</i>	<i>Division</i>	<i>Strong</i>		<i>Weak</i>		<i>Total words in sub-corpus</i>
		N	f	N	f	
TCC	Science	3	0.028	26	0.242	107322
	Arts	32	0.219	37	0.253	145964
PsyC	Science	3	0.042	19	0.266	71547
	Mixed	28	0.127	39	0.177	219878
	Arts	6	0.063	10	0.105	94797
SLC	Science	12	0.101	36	0.302	119323
	Mixed	30	0.129	41	0.177	232151
	Arts	19	0.153	20	0.161	123864

Again, these variants are more frequent in Arts articles, and there are very low token numbers in the Science articles of the TCC and PsyC. Figure 3.7 shows the distribution of strong and weak modal adverbs in the TCC. Here the distributional differences within Science agree qualitatively with prediction, while those in Arts do not.

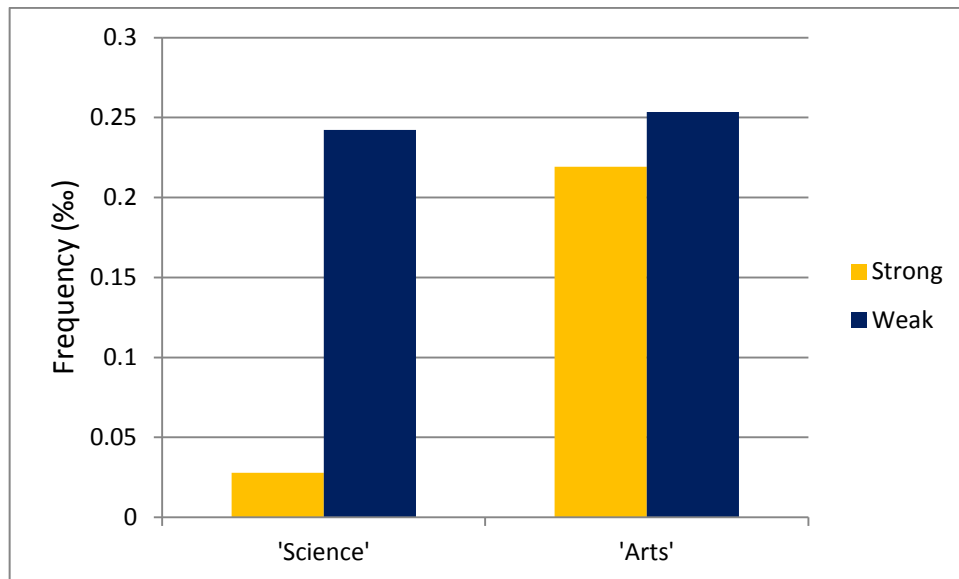


Figure 3.7 Frequency of modal adverbs in the TCC
($\chi^2 = 11.55$; $df = 1$; $p < 0.001$)

Figures 3.8 and 3.9 show the distribution of modal adverbs in the psychology corpus and the sociolinguistics corpora respectively. Pairwise comparisons show that Science and Mixed are not significantly different from one another, and neither are Mixed and Arts in either the PsyC or the SLC.⁶⁸

All journals follow the Science pattern with respect to their balance of strong and weak modal adverbs. They all use more weak than strong modal adverbs.

⁶⁸ In the PsyC, Science did not differ significantly from Mixed ($\chi^2 = 5.78$; $df = 1$; $p = 0.049^*$), and neither did Mixed from Arts ($\chi^2 = 0.098$; $df = 1$; $p = 0.75$).

In the SLC, Science did not differ significantly from Mixed ($\chi^2 = 3.73$; $df = 1$; $p = 0.053$), and neither did Mixed from Arts ($\chi^2 = 0.43$; $df = 1$; $p = 0.51$).

*Bonferroni correction makes the alpha level here $0.05/3 = 0.17$, so this is not significant.

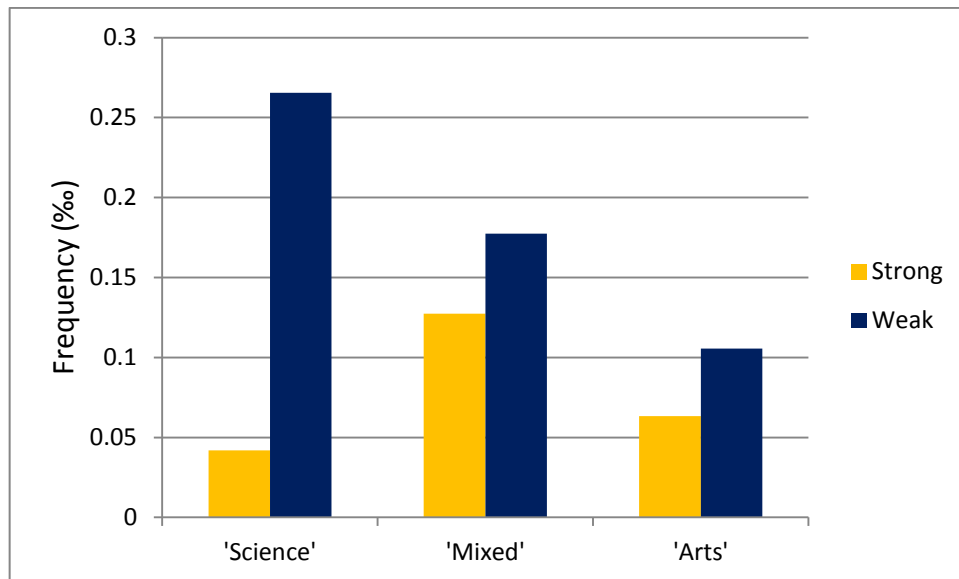


Figure 3.8 Frequency of modal adverbs in the PsyC
($\chi^2 = 5.80$; $df = 2$; $p = 0.055$)

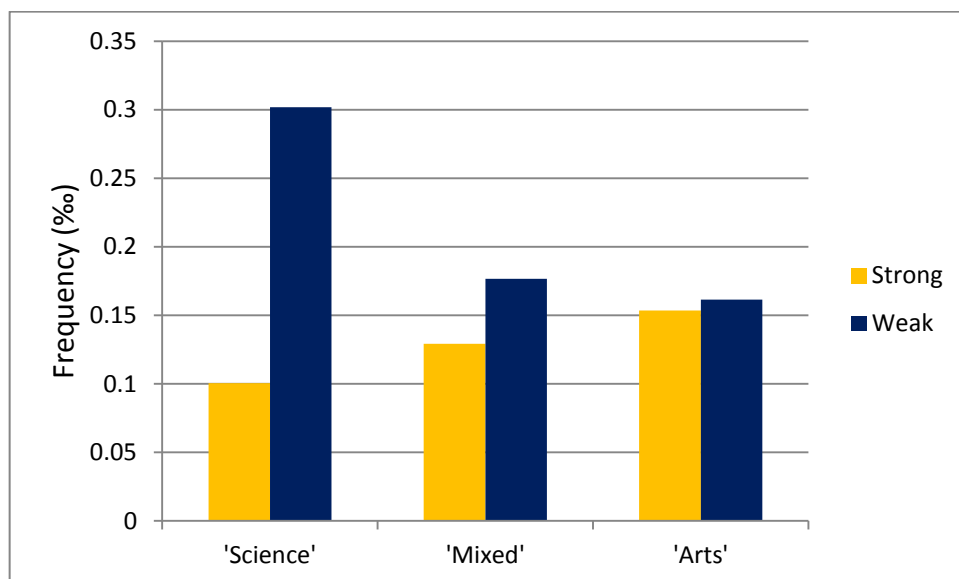


Figure 3.9 Frequency of modal adverbs in SLC
($\chi^2 = 5.83$; $df = 2$; $p = 0.054$)

Figures 3.8 and 3.9 give the impression of a shifting distribution from left to right. It appears that the Sciences have a very strong preference for weak over strong modal adverbs, while this preference is less strong for Mixed and Arts journals. In

light of the pairwise comparisons, however, this apparent difference, while suggestive, is not statistically significant.⁶⁹

3.4 Summary

This chapter started from three theoretical assumptions: first, that disciplines vary in their tendencies to adopt various epistemic stances, and that differential patterns of stance-taking are related to the epistemic policies assumed within disciplines. Secondly, it was assumed that disciplines recursively instantiate the same patterns of epistemological difference internally as are proposed to exist between disciplines. Thirdly, it was theorized that epistemological difference is indexically linked to patterns of linguistic difference, and that linguistic variation would therefore track epistemic policy variation. In the present chapter I aimed to test whether linguistic variation could be predicted by epistemological variation.

Next, I argued that epistemological variation could be operationalized by sampling research articles from academic journals in different disciplines, and that the relationship between epistemological variation and linguistic variation could therefore be investigated by comparing the patterns of language use across and within disciplines. I then applied these ideas to the three evidential variables: evidential verbs, modal verbs, and modal adverbs. I reproduce here the variable coding distinctions for these variables, as well as my predictions about their behaviour.

⁶⁹ Pairwise comparisons were also done here between Science and Arts. This was not significant in the PsyC ($\chi^2 = 2.92$; $df = 1$; $p = 0.087$) or SLC ($\chi^2 = 5.28$; $df = 1$; $p = 0.022^{**}$).

^{**}Bonferroni correction makes the alpha level $0.05/5 = 0.01$.

Table 3.13 Variable summary

Modal verbs	Strong	<i>must, will</i>
	Weak	<i>may, might</i>
Modal adverbs	Strong	<i>certainly, necessarily</i>
	Weak	<i>possibly, probably</i>
Evidential verbs	Alethic (mind-independent)	<i>demonstrate, prove, indicate, show</i>
	Epistemic (mind-dependent)	<i>think, believe, know, infer, expect, argue, claim</i>

Table 3.14 Prediction summary

<i>Archetype</i>	<i>Policy elements</i>	<i>EPR</i>	<i>Modality</i>	<i>Evidential verbs</i>
Arts	$\langle S_o, K_{JB}, I_{subj} \rangle$	wide	strong > weak	epistemic > alethic
Science	$\langle S^+, K_{JTB}, I_{obj} \rangle$	narrow	weak > strong	alethic > epistemic

There was striking agreement with prediction for evidential verbs: Arts journals used more epistemic than alethic, and Science journals more alethic than epistemic. This pattern was recursively instantiated in all three corpora. This means that scholars within single disciplines are using the same evidential language as that which differentiates the Arts and Science archetypes. Intra-disciplinary (PsyC and SLC) differentiation between Arts and Science journals was smaller than inter-disciplinary (TCC) differentiation. This recursive patterning of evidential verb distribution is strong quantitative support for the applicability of the social semiotic processes described in Chapters 1 and 2. A wider EPR was suggested as an explanation for why Mixed journals resembled Arts more than Science in their patterns of evidential verb use.

Modal verbs and adverbs did not demonstrate such clear agreement with prediction. Modal verbs were differentially distributed according to prediction in the TCC. The disciplinary corpora only repeated this pattern partially. The pattern

for adverbs appeared to be recursively instantiated, but the more even distribution of Arts was not significantly different from the divergent distribution in Science.

In the next two chapters, I look at an expanded range of evidential language available in the linguistic materialization of epistemic stance. I control for a range of internal and external variables via linear mixed modelling, and compare inter-disciplinary variation with variation by epistemic policy. In this way I am able to investigate not only inter- and intra-disciplinary variation of the type explored in the corpus study here, but I also look at intra-speaker variation. That is, I not only look to see whether the patterns of variability that obtain in larger social levels are recursively instantiated at smaller scales, but I also ask whether they are available for stylistic variation according to topic of speech.

Chapter 4. Interview Methods and Results (Internal Factors)

In Chapter 3, corpus analysis of research articles revealed cross-disciplinary variation in the frequency of evidential verbs, and also of modal verbs and adverbs. Within the “Two Cultures” corpus, Science journals preferred the more “objective” alethic verbs (e.g. *demonstrate*, *show*) while Arts journals preferred the more “subjective” epistemic verbs (e.g. *believe*, *know*). This inter-disciplinary pattern was recapitulated at the intra-disciplinary level in both the sociolinguistics and psychology corpora, providing quantitative evidence of indexical recursivity. Furthermore, strong modal verbs (e.g. *must* and *will*) were more common than weak modal verbs (e.g. *may* and *might*) in Arts journals, while the reverse was true in Science journals. This pattern was not repeated for the modal adverbs, however, nor was it recapitulated in the disciplinary corpora.

In this chapter and the next I analyse interview data in order to quantitatively and qualitatively interrogate these findings in ways that were not practicable with the corpus analysis. I investigate how these variables act in concert to communicate epistemic information when set against the (controlled) backdrop of a range of linguistic and social variables. I also investigate whether these epistemic variables are involved in style shifting, in other words, whether individual speakers use these variables differently in different contexts for different ends. On this basis, I examine the extent to which the patterns of difference described above generalize to other populations (within academia) and to other modes of communication (talk versus writing), and I hence evaluate the robustness and wider significance of my findings.

In the present chapter, I first describe in Section 4.1 how I recruited my interview population of 34 academics from a range of disciplines including critical studies, geography, law and physics. As noted in Chapter 0, these disciplines partially overlap those investigated in Chapter 3 so as to look for patterns that generalize across a broad range of disciplines, and across talk and text. I describe the structure of the interviews in Section 4.2. In Section 4.3 I describe how I operationalize and code the linguistic (internal) variables that could influence epistemic variables of the type treated in Chapter 3.⁷⁰ Given the fact that epistemic information can be expressed via a range of linguistic strategies in English, including lexical and modal verbs and adverbs (e.g. Kärkkäinen 2003), hedges and boosters (e.g. Holmes 1990), and tag questions (e.g. Schleef 2009), I develop a novel *epistemic stance index* (ESI) that scores each utterance on the basis of a broader suite of epistemic features than was used for the corpus analysis (cf. Van Hofwegen and Wolfram 2010). I then present and discuss the findings in respect of these internal variables in Sections 4.4 and 4.5.

4.1 Interview participants

I emailed prospective participants at colleges of the University of London: a large and diverse group of academics who nonetheless share a city and a greater institutional culture. This afforded a degree of control over two demographic variables. I also wanted to avoid the participants thinking about disciplinary difference ahead of time since this would have introduced a further variable, so the bare minimum of information was provided in the contact email in order to ensure that consent to participate would be meaningful. I explained that I am a

⁷⁰ In the next chapter (5) I examine the social (external) variables affecting epistemic variables.

PhD student researching the language of academia, and I asked if they were available to be interviewed about their research and academic experience. I said that the interview would last around one hour, be recorded for transcription and analysis, and that all materials would be anonymized. Interviews were arranged in this way with 34 participants from epistemologically diverse disciplines as listed in Table 4.1.

Table 4.1 Interview participants

<i>Discipline</i>	<i>Speaker code</i>	<i>EPR</i>	<i>PhD year</i>	<i>Academic age</i>	<i>Sex</i>	<i>Native speaker?</i>
Arts	a	W	2002	10	F	Y
	b	W	2002	10	F	Y
	c	W	1997	15	F	N
	i	N	1997	15	M	Y
	j	N	2006	6	M	Y
	k	N	1999	13	F	Y
Law	3	W	1990	22	M	Y
	d	W	1992	20	M	Y
	e	W	2003	9	F	Y
	m	W	1973	39	M	Y
	n	N	1988	24	M	Y
Geography	1	N	2006	6	F	Y
	2	N	2004	8	M	N
	f	W	1997	15	F	Y
	g	N	1993	19	M	Y
	h	W	2004	8	F	Y
	l	N	1990	22	M	Y
	z	W	1973	39	F	Y
Economics	v	N	2002	10	F	N
	w	N	1993	19	M	N
	x	W	2005	7	M	N
	y	N	2001	11	M	N
Physics	6	N	1998	14	M	N
	8	N	2001	11	F	N
	p	N	1978	34	M	Y
	q	N	2000	12	M	Y
	r	N	2001	11	M	Y
	s	N	2000	12	M	N
Maths	4	N	2007	5	M	N
	5	N	1983	29	M	Y
	7	N	2004	8	M	Y
	o	N	1990	22	M	Y
	t	W	1997	15	M	Y
	u	N	1995	17	M	Y

Inter-disciplinary epistemological variation⁷¹ was well represented among participants, as suggested by the list of disciplines in Table 4.1. Arts includes comparative literature, English literature and film studies. ‘Law’ includes mainly jurisprudence and sociology of law. ‘Geography’ is split between physical and social geographers. ‘Economics’ is split between macro- and micro-economists. ‘Physics’ means empirical physics: materials science, particle physics and cosmology. ‘Maths’ includes theoretical physics (quantum field theory and string theory), and also geometry and statistics.

These subject descriptions suggest that intra-disciplinary epistemological variation⁷² was also well-represented in the participant population. This differentiation was operationalized via a binary variable called *epistemic policy range*, which can either be wide or narrow (this appears as ‘EPR’ in Table 4.1). Recall from Chapter 2 that the EPR is a somewhat impressionistic notion of how many *epistemic policies*⁷³ a person can “legitimately” apply to their research. In Science, the prevailing EPR is narrow, such that a biologist and a physicist will agree on the use of the scientific method, on the utility of hypothesis testing, on evaluating a theory on the basis of its predictive power. In the Arts, the prevailing EPR is wide, such that a scholar may apply several mutually contradictory epistemic policies during their career, and members of the same department can

⁷¹ This *between*-discipline variation was examined via the “Two Cultures” corpus in Chapter 3.

⁷² This *within*-discipline variation was examined via the psychology and sociolinguistics corpora in Chapter 3.

⁷³ *Epistemic policy* was defined in Chapter 1 as incorporating ways of finding things out. Epistemic policies partially *frame* the phenomena which are the objects of beliefs, and hence they correspond to ways of seeing and interpreting the world. Epistemic policies are distinct from theories and paradigms which are falsifiable. Rather, policies are value-laden *values*, *attitudes* and interpretive *norms* with respect to facts, and, as such, they are less likely than theories and paradigms to be overturned by new facts.

disagree about the best epistemological basis for research. The discipline of Linguistics recapitulates this “Two Cultures” pattern: it is separated into formal research on the one hand, and socially-situated research on the other. Formal linguistics places scientific method explicitly at its core, devoting a remarkable amount of its discourse to describing its own status as a science, and rejecting theories if they make counterfactual predictions, or if they fail to make testable predictions. Socially-situated linguistics in contrast encompasses positivistic studies of sound variation and change; linguistic constructionist accounts of the performance of identity; and critical theoretic work in linguistic anthropology. It is not uncommon to see positivism and linguistic constructionism represented within a single paper. Formal linguists are likely to be skeptical of these approaches to the study of language.

Participants were coded as having a narrow or wide EPR depending on their responses to the interview prompts discussed below. While narrow (N) EPRs are more common in Science, and wide (W) EPRs in Arts, Table 4.1 shows considerable variability within the disciplines. EPR is discussed at length in the next chapter as part of the analysis of external variables.

The recruitment process described above yielded a good overall spread of age, sex and native speaker status, albeit quite variable between different disciplines, as summarized in Table 4.2. These variables are discussed briefly below and at length in the next chapter.

Table 4.2 Interview participants' vital statistics

<i>Discipline</i>	<i>EPR</i>		<i>Sex</i>		<i>Native?</i>		<i>Academic age</i>	
	N	W	F	M	Y	N	Mean	SD
Arts	3	3	4	2	5	1	11.5	3.51
Law	1	4	1	4	5	0	22.8	10.76
Geography	4	3	4	3	6	1	16.7	11.54
Economics	3	1	1	3	0	4	11.8	5.12
Physics	6	0	1	5	3	3	15.7	9.05
Maths	5	1	0	6	5	1	16.0	8.85
<i>Total</i>	22	12	11	23	24	10	15.8	8.93

Academic age was calculated as years since PhD completion (range 5–39). This is a somewhat crude measure of academic lifetime, since it does not take account of the fact that PhDs have different durations in other countries, or may be completed part-time, and academics have diverse career patterns after graduation. Inclusion of age as a variable is however motivated by several factors. First, it seems uncontroversial that the extent to which an academic “sounds like” their discipline, or is sensitive to disciplinary difference, will be a function of their amount of exposure to the discourses of their discipline and academia (see discussion of language socialization in Section 1.2.1). Secondly, there is anecdotal evidence of a shift in stylistic behaviour during an academic’s career (e.g. Lakoff 1990: 159). Lakoff described an impressionistic bell-shaped curve of disciplinary formality with career progression such that, undergraduates are not yet able to produce authentic disciplinary language, postgraduates and early academics are maximally able to do so, and professors and senior academics revert to a more informal style. This is perhaps truer in written Academic English than in spoken, and this variable will offer some insight into whether this claim is supported empirically.

Participants' sex was also noted. In earlier work (Weston 2009), variable rule analysis indicated that sex was not a significant predictor of variation in modal verb strength in academic lectures.⁷⁴ The present population will allow for further testing of this result within the context of interview talk. Within my sample population, men are overrepresented in some disciplines, while women dominate in others; this was not by design, but it reflects a historical pattern of sexual differentiation across the disciplines which still prevails today.

Finally, speakers' native language (L1) was noted in order to examine the relative effect of this and epistemological difference on variability in epistemic language use.

4.2 Modified sociolinguistic interview⁷⁵

The time and venue of each interview was negotiated by email, and the interview was in all cases the first time I had met the participant. The majority of interviews took place in the participant's office, although one requested that we meet in the Senior Common Room of his institution, and another requested that we meet in a pub.

At the time of meeting, I introduced myself as John, and thanked them for agreeing to do the interview. I confirmed that they were happy to be recorded, and reiterated that the recordings would be anonymized. I then turned on the Dictaphone-style digital recorder and placed it on a desk top to one side of the conversational axis where possible, so as to be relatively unobtrusive. Participants

⁷⁴ Lectures were examined from a range of disciplines in the MICASE (Simpson *et al.* 2002) and BASE (Thompson and Nesi 2001) corpora of academic spoken English.

⁷⁵ Ethical approval was given for the interviews by the Queen Mary Research Ethics Committee.

often spontaneously closed windows if there was a surge in traffic noise (although this was generally not picked up significantly by the recorder). In the Senior Common Room, although initially empty of other people, there was an influx towards the end of the interview, and background noise grew to a level that was non-ideal. It was still possible to hear what I and the interviewee had been saying, but, for the subsequent pub interview, I decided to append lapel microphones to the recorder. This had in fact also been suggested by the participant. Although the recording equipment did not initially seem to distract him, he did comment on needing to be careful about what he said about some other academic disciplines. This led to a digression in the interview where I said that I would not be reproducing large sections of text in a way that would identify anyone or their institution, and this reassurance was given pre-emptively in subsequent interviews.

In all cases I looked into the participant's research interests and familiarized myself with one or two key dichotomies or research trends in order to prompt participant talk more smoothly. This was of course much easier in some areas than others, but I think on balance that expressing some specialist knowledge about the participant's research domain was more fruitful than confounding. I explained that I had been a secondary science teacher when this arose naturally out of the conversation—which was often the case in disciplines allied to physics and maths. Conversely, in disciplines allied to the Arts, several participants commented on the relevance of linguistics (my specialism) to their work, and they often assumed that I had a working knowledge of the cultural field in which they worked. On balance, I think I was able to demonstrate sufficient

credentials to at least appear genuinely interested in the details of interviewees' research in all disciplines. At the end of all interviews I gave a short debrief in which I explained that I was primarily interested in patterns of language use, and that I would inform them of results when available if they wished.

The traditional sociolinguistic interview (e.g. Labov 1971) aims at promoting a range of narrative styles by directing the interviewee's attention towards their speech to varying degrees. By giving prompts such as *Please read out this list of words* and *Can you tell me about a time when you nearly died*, the idea is to access the full range from greatest to least attention paid to speech, and therefore to produce that speaker's full stylistic repertoire.⁷⁶ I am not primarily interested here in formality or its association with social class (see Section 2.1.1): my questions are not designed to manipulate participants' attention paid to speech for the purpose of accessing their stylistic variation as it recapitulates social class structures. Rather, my questions are designed to manipulate participants' choice of *epistemic policy* in order to access their stylistic variation as it reproduces social epistemological structures at the level of the discipline, wider academia, or society in general.

My interview schedule thus follows a modular pattern, with each module A to E focusing on a different aspect of academic experience, each time designed to promote a particular set of epistemic policies and thereby make particular stylistic options more felicitous. Furthermore, responses to some of the questions formed the basis of the EPR classification listed in Tables 4.1 and 4.2. Below I elaborate how these modules relate to the linguistic and epistemological variation

⁷⁶ A well-known problem at the "least formal" end of the style spectrum is the *Observer's Paradox*, i.e. the problem that observing or recording someone speaking will introduce some irreducible level of formality into the situation (Labov 1972: 209–10).

under investigation. Each question was a starting point, and normally several related questions were developed on the basis of participants' responses.

A. Research and professional background

1. What are you researching at the moment?
2. How did you become an academic?

Module A is designed to put the participant at ease, and also to encourage the use of two contrasting epistemic policies. Question A1 elicits how the participant views their research object, and how they are researching it—in particular, how they expect to arrive at new knowledge. Question A2 elicits biographical knowledge, gained experientially, and framed within the speaker's subjectivity. It is possible that both these questions will elicit explications of epistemic policy, but one would expect this to be much more common in response to the A1 than A2.⁷⁷

B. Teaching and impact

1. What courses do you teach/ have you taught recently?
2. How do today's students compare to x years ago?
3. What alternative belief systems or misconceptions do you encounter among students? How do you "deal with them"?
4. How important is public engagement with your subject? Do you give talks to the general public?
5. What do you think of the "impact" agenda?

⁷⁷ The relationship between topic and epistemic policy is discussed in Chapter 5.

B1 is again an “easy” question for the participant, designed to facilitate transition to a new module area. It also provides a snapshot of the range of expertise of the participant. Question B2 was designed to elicit judgements about historical patterns of change that they have not formally studied.⁷⁸ B3, B4 and B5 were designed to elicit comments on epistemic policy, i.e. what are the disciplinary norms; how do students acquire them; are they a barrier to communication beyond of the academy; do taxpayers have a right to understand how their money is spent? This sequence becomes increasingly morally charged, and participants almost universally greeted question B5 with a smirk. Some asked whether this had been the whole point of the interview; I assured them that it was not.

B3, B4 and B5 provided evidence of speakers’ epistemic policy range (EPR). Some speakers closed down these lines of questioning, saying that they had not thought about it and therefore could not comment. Others said they had not thought about it before, but could speculate. A third group had opinions on these matters that appeared more or less well-rehearsed. I took these three categories of response to indicate progressively wider EPR, since they provided increasing evidence of the participant habitually thinking seriously about issues that were outside of their research expertise.

⁷⁸ This question promoted quite diverse responses. Some participants assumed it was about change in the ethnic composition of the student body; others interpreted it in terms of declining standards of state school education; others in terms of changing governmental funding regimes and increasing corporatization of academia. In some cases this led to the participant saying that they didn’t feel competent to comment, while in others it promoted a “soapbox” soliloquy.

C. (Inter)disciplinarity

1. Where is your field going in the next 10 years/other period?
2. How important is inter-disciplinary collaboration in academia? What problems and benefits arise?
3. How representative of your field are you/your research?
4. What dimensions of variation would you include in a typology of academic disciplines? What do you think of [Figure 4.1]?

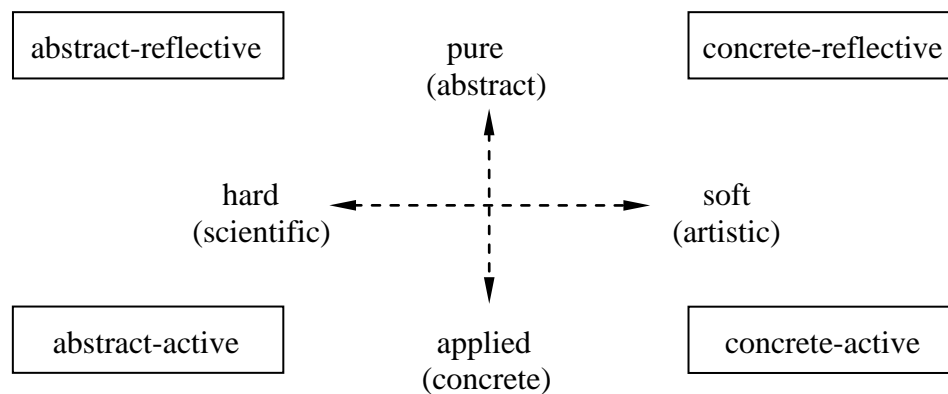


Figure 4.1 A typology of academia
(based on Becher and Trowler 2001: 36)

Question C1 was difficult, and some participants commented that it was a professorial interview question. It was designed to give me an impression of the unity of the participant's discipline, i.e. the extent to which the participant's research fitted within a broader research programme, and also simply to encourage speculation about future events. Questions C2, C3 and C4 were designed to gain information about how the participant views their discipline and their place in it. The question of inter-disciplinarity produced quite divergent responses. Figure 4.1 was designed to simultaneously partially legitimize

problematic binary academic divisions (hard/soft and pure/applied); to offer less emotive alternative terms; and to provide a simplistic picture to react against. Participants used it in all these capacities.

Question C2 also provided further evidence for classifying the participant's EPR. Some participants said that inter-disciplinary collaboration was a waste of time. Some said it was potentially useful within certain limits, e.g. between biology, chemistry and physics. Others said that collaborations between philosophers, critical theorists and geologists could be fruitful. I took this increasing level of openness to epistemologically diverse research interfaces to indicate progressively wider EPR.

Module D I consisted of two scenarios from experimental philosophy. This was to gain further evidence for classifying participants' EPR, both in terms of their responses to the scenarios, but also in terms of their meta-task talk. These scenarios were originally designed to elicit judgements about the justification of knowledge, in particular, whether one can be said to *know* something by accident, and whether the nature of the accident affects people's judgements about that.

D. Experimental philosophy scenarios

1. Jill's Buick (Gettier 1963)

Bob has a friend, Jill, who has driven a Buick for many years. Bob therefore thinks that Jill drives an American car. He is not aware, however, that her Buick has recently been stolen, and he is also not aware that Jill has replaced it with a Pontiac, which is a different kind of American car.

Which word best completes the sentence below?

Bob _____ that Jill drives an American car.

believes *doubts* *knows*

2. Truetemp scenario (Weinberg *et al.* 2001)

One day Charles is suddenly knocked out by a falling rock, and his brain becomes re-wired so that he is always absolutely right whenever he estimates the temperature where he is. Charles is completely unaware that his brain has been altered in this way. A few weeks later, this brain re-wiring leads him to believe that it is 71 degrees in his room. Apart from his estimation, he has no other reasons to think that it is 71 degrees. In fact, it is at that time 71 degrees in his room.

Which word best completes the sentence below?

Charles _____ that it was 71 degrees in the room.

believes *doubts* *knows*

Some people deny that Bob or Charles have knowledge. Some judge that Bob does not, but Charles does, and some judge that both men *know* the fact in question. I take these responses to indicate progressively wider EPR. Each speaker was coded as having a “narrow” or “wide” EPR based on the balance of responses to these scenarios, and to questions B3–5 and C2.

4.3 Variables: Operationalization and coding

The 34 interviews (a total of just under 34 hours of recordings) were transcribed. Portions of each of the 34 transcripts were segmented into 8891 clausal⁷⁹ tokens, and after discarding tokens that could not be coded, these were ultimately reduced to 8270, i.e. just under 50 tokens per topic per participant.⁸⁰ This provided sufficient tokens for up to three binary variables to be compared in interaction simultaneously, and to still have at least 5 tokens per variant combination

⁷⁹ A clause is the smallest part of a sentence encoding a complete proposition (Kroeger 2005: 32).

⁸⁰ Two participants were very reluctant to discuss one topic, so fewer tokens were included in those instances.

(because $50 > 2 \times 2 \times 2 \times 5$). In other words, sufficiently many tokens were coded in order for statistical analysis to be reliable. In Section 4.3.1 I explain how the dependent variable—epistemic stance index (ESI)—is composed of 6 variable elements, and how these were coded to give a combined value for the ESI. In Sections 4.3.2 to 4.3.8, I explain how the levels of each of these variables were coded for the internal variables listed in Table 4.3.

Table 4.3 Internal variables

<i>Variable type</i>	<i>Variable</i>	<i>Levels</i>
Dependent	ESI	(continuous)
Independent	main verb type	affective, alethic, epistemic, other
	aspectual class	dynamic, stative
	tense	past, nonpast
	voice	active, passive
	subject type	pronoun, noun
	polarity	positive, negative
	talk type	evaluative, narrative
Offset parameter ⁸¹	log(words)	(continuous)
Grouping	speaker	34 participants

These variables are normally labelled “internal” in sociolinguistic analysis (e.g. Labov 1994: 1–3; Coupland 2001), i.e. they are defined in terms of linguistic phenomena in contrast to “external” variables which are defined in terms of social phenomena. Labov (1994: 3) notes that, in addition to this *a priori* distinction in variable type, internal and external variables behave differently in statistical model reduction.⁸² For these reasons, and others discussed in Chapter 1, I treat

⁸¹ The log of the length (in words) of each clause was initially included in the maximal model as an offset parameter. Despite the fact that increasing the length of a clause could plausibly have a ‘diluting effect’ on the force of an epistemic commitment, log(words) turned out not to significantly improve the fit of the models and was therefore removed.

⁸² The removal of an external variable modifies the effect size of the other externals but not of the internals, while the removal of an internal variable generally affects neither.

them separately in this thesis. The present chapter looks at the internal variables listed in Table 4.3 above, while Chapter 5 looks at external variables.

I now develop the epistemic stance index (ESI), and, in the following sections, arrive at predictions in terms of ESI scores by considering what I refer to as the *intrinsic* and *extrinsic* epistemic meaning of each internal variable elements. I argue that the variables in Table 4.3 contribute to epistemic stance both intrinsically, i.e. in virtue of their semantic “core” content, as well as extrinsically, i.e. in virtue of their association with the discourses of particular academic disciplines. I then evaluate these predictions using linear mixed modelling.

4.3.1 A metric of epistemic stance

Examples (3a–d) all encode the same proposition (*that it is snowing*), however they also encode information about the speaker’s *epistemic stance* towards that proposition, i.e. their judgement of its status as knowledge.⁸³

- (3) a. Es schneit.⁸⁴
 b. It’s snowing.
 c. It’s snowing, I think.
 d. I definitely think it’s snowing.

Examples (3a) and (3b) are “bald” expressions of the propositional content which would normally be interpreted as indicating that the speaker believes that the propositional content is true.^{85,86} In Example (3c), the propositional content is

⁸³ Cf. Johnstone (2009: 30–31).

⁸⁴ Tarski’s (1935: 271) example ‘„es schneit“ ist eine wahre Aussage dann und nur dann, wenn es schneit.’ is made more perspicuous by translating it as “‘es schneit’ is true-in-German if, and only if, it is snowing.”

⁸⁵ The analysis of these sentences draws on the discussion in Chapter 3 of Nuyt’s (2006: 1–2) view of modality as a super-category that subsumes several theoretical ‘difference[s] of opinion’.

weakened with the discourse marker *I think*, which suggests that the speaker has doubts about the truth of the proposition.⁸⁷ In Example (3d), the propositional content is again weakened with *I think*, and simultaneously strengthened with *definitely*. Furthermore, Examples (3c) and (3d) relativize the propositional content to the speaker with *I think* (as opposed to e.g. *it seems* or *so they say*), so in addition to the speaker's judgement of the truth of the proposition, we also gain some information about the kind of evidence the speaker is using to make that judgement.

The verbs and adverbs examined in Chapter 3 gave only a partial indication of epistemic stance, both in terms of what the variables indicate about epistemic stance (strength of commitment, and speaker-relativity), and in terms of the number of variants examined for each variable. Since these variants occurred in prohibitively low frequencies in interview talk, more variants were coded for the interview data, and four more categories of epistemic language were included to give a more complete picture of the epistemic stances speakers took, as described next.

The strength of commitment to a proposition is reflected in the *modality* of the clause. The strong/weak distinction in verbal and adverbial modality used in Chapter 3 is applied here (with the addition of adjectival modality). Strong modal variants (e.g. *must*, *necessarily*, *necessary*) score +1, while weak variants (e.g. *may*, *maybe*, *potential*) score –1, as listed in Tables 4.4 and 4.5.

⁸⁶ This assumes that some version of Grice's (1989: 26) maxim of quality is being observed, i.e. that truthfulness is desirable (and indeed possible).

⁸⁷ A formal analysis of (3d), and possibly (3c), would assume that it consists of two nested clauses, such that *it's snowing* is the complement clause of the matrix clause *I definitely think it's snowing*. Both clauses would be assumed to express propositional content. Since the matrix verb *I think* functions as an epistemic comment on the complement clause, however, I treat (3d) as expressing a single proposition (that it is snowing) and an epistemic stance with respect to that proposition.

Table 4.4 Verbal modality coding conventions⁸⁸

strong (+1)	<i>must, will, shall, cannot, should, would, have to, need to, be required to</i>
weak (-1)	<i>may, might, could, can, allow, let, permit, get to, don't have to</i>

Table 4.5 Adverbial and adjectival modality coding conventions

strong (+1)	<i>necessarily, certainly, necessary, (I'm) certain, be guaranteed that, simplest possible, (I'm) sure, I know⁸⁹</i>
weak (-1)	<i>maybe, possibly, probably, likely, possible, probable, perhaps, potential, if you're lucky, I'm not sure, I don't know</i>

Examples (3) and (4) illustrate how these coding distinctions apply to tokens from my interview data. Example (3) scores +1 for a strong modal verb, and Example (4) scores +1 for a strong modal adverb.

- (3) er: be be be because you you *have to* check EC.N.19.M⁹⁰
- (4) and *certainly* strategies that revolve around the term AR.W.10.F
impact

In addition to the strength of commitment to a proposition, epistemic stance can provide information about whether the speaker considers a proposition to be an

⁸⁸ While the examples given in Tables 4.4 to 4.9 are not exhaustive for any particular variety of English, they are exhaustive of the texts of the interviews analysed here.

⁸⁹ *I know* is included here when it was judged to have the same effect as *I'm certain that* or *certainly*. In this case, marked by emphatic prosody, it seems to carry relatively little subjectivity (relativity– in the terms of Table 4.5). *I know* was only used in this manner in a small number of tokens, which were not also coded as occurrences of lexical *know*. Stubbe and Holmes (1995) also suggest a class linkage such that *you know* is favoured over *I think* in working class speech. This linkage will not be investigated here since the small sample group was, I assume, relatively homogeneous with respect to socioeconomic class.

⁹⁰ Codes indicate participants listed in Table 4.1. In this case, economist, narrow EPR, academic age of 19, and male.

objective matter, or whether they consider it to be a subjective matter, i.e. the speaker-relativity of the proposition. Propositional *objectifiers* (e.g. *actually*, *don't forget that*) score +1, and *subjectifiers* (e.g. *I'd say*, *for me*, *personally*) score –1. This scoring matches that of strong and weak modality respectively under the assumption that objective claims are stronger (and hence more easily defeasible) than subjective claims.

Table 4.6 Relativity coding conventions

objectifiers (+1)	<i>actually, in fact, you/we know, really, don't forget that, if you think that, obvious/ly, looks like, sounds like, "cosmology tells us"</i>
subjectifiers (–1)	<i>I think, I'd say, for me/him/her, as I say, I'd prefer, I mean, I guess, I think you'll find, as I said, seemingly, apparently, ostensibly, personally, I feel, seem to me</i>

Examples (5) and (6) illustrate how these coding distinctions apply to tokens from my interview data. Example (5) scores +1 as for its objectifier. Example (6) is the *negation* of an objective knowledge claim, and is scored as –1.

- | | | |
|-----|-------------------------------------|-----------|
| (5) | and <i>really</i> asks me to | MA.N.8.M |
| (6) | but <i>we don't know</i> what it is | PH.N.11.M |

The *domain* of a proposition is related to its propositional quantification (universal versus existential). If the clause suggests universality by using *generalizers* (e.g. *all*, *generally*, *typically*) then this is treated as a relatively strong claim, and it is coded as +1. The use of *restrictors* (e.g. *particular*, *certain*, *sometimes*) was treated as weakening the claim, and was coded as –1.

Table 4.7 Domain coding conventions

generalizers (+1)	<i>all, generally, always, never, constantly, everyone, people, tend to, whatever, normally, not a single, any, ever, never, typically, normally, (quite) often, all sorts, majority, most, a lot/many (people), (things) like that</i>
restrictors (−1)	<i>particular, specifically, simply, merely, just, at least, certain, some, kind, type, purely, exclusively, only, sometimes, right now, at the moment</i>

Example (7) scores +1 for a generalizer, while Example (8) scores −2 for doubly restricting its main verb.

- | | | |
|-----|---|-----------|
| (7) | and I'm looking at <i>all</i> these numbers | MA.N.17.M |
| (8) | that you've you've added in <i>some</i> direct way from your own <i>particular</i> research | LA.W.20.M |

The final two categories are related to Holmes's (1990) 'hedges and boosters'. *Intensifiers* and *equators* boost the strength of propositional commitment by presupposing a commitment to the equivalent un-boosted proposition: if Bob believes that it's a *very* nice day, he must also believe that it's a nice day *tout court*. Conversely, *softeners* and *approximators* do not seem to presuppose commitment to the core proposition: if Bob believes that it's a *somewhat* nice day, then he does not quite believe that it's a nice day. Softeners thus act as hedges, having a modal weakening effect. The intensity of a clause, as well as the use of comparators, thus provides modal information by implication rather than in virtue of its semantic content.⁹¹

⁹¹ Holmes (1990) is careful to note that hedges and boosters are dependent on prosody such that their effect can be opposite to that described. In the data used here, sarcastic and other prosodic cues to such semantic inversion were rare, and they were coded as such when they did occur.

Table 4.8 Degree coding conventions

intensifiers (+1)	<i>very (much), (too) much, indeed, quite, completely, so, entirely, bit more, awful lot, almost entirely, really, very few, just, not at all, increasingly, thoroughly, quite a lot</i>
softeners (−1)	<i>somewhat, a little, fairly, rather, quite, scarcely, a bit, hardly, try to, hope to</i>

Table 4.9 Comparator coding conventions

equators (+1)	<i>precisely, exactly, equally, equivalent, the same as</i>
approximators (−1)	<i>roughly, essentially, fairly, basically, in short, about, sort of, kind of, in a sense, like, in a way</i>

Example (9) scores +1 for an intensifier, and Example (10) scores +1 for an equator.

- (9) erm. so I see those connections as *enormously* important LA.W.20.M
- (10) who *exactly* their mother was MA.N.17.M

The six categories described above—verbal modality, adverbial and adjectival modality, relativity, domain, degree and comparators—were combined to give an overall epistemic stance index (ESI). The ESI is thus able to capture the combined effect of modality, evidential verb choice, etc., on epistemic stance, in contrast to the separate analysis of Chapter 3. The epistemic stance index ESI is the sum of the scores for the six epistemic language components described above, and it is therefore used to operationalize epistemic stance. As illustrated in Examples (11) to (13), more positive ESI scores indicate greater certainty, objectivity, and generality, while more negative ESI scores indicate greater caution, subjectivity and specificity.

(11)	well <i>don't forget</i> that <i>most</i> serious teaching I do is <i>really</i> running phd students	PH.N.34.M	<i>don't forget</i>	(relativity+)	+
					1
			<i>most</i>	(domain+)	+
					1
			<i>really</i>	(relativity+)	+
					1
			ESI		+
					3
<hr/>					
(12)	er <i>I mean</i> the: micro one course <i>I</i> <i>wouldn't say</i> it's <i>identical</i>	EC.W.7.M	<i>I mean</i>	(relativity−)	−
					1
			<i>I wouldn't</i>	(relativity−)	−
			<i>say</i>		1
			<i>not identical</i>	(domain−)	−
					1
			ESI		−
					3
<hr/>					
(13)	<i>I think</i> that we've got it <i>about</i> right in physics er with <i>about</i> [cough] <i>typically</i> teaching two modules. er.	PH.N.34.M	<i>I think</i>	(relativity−)	−
					1
			<i>about</i> × 2	(comparator −)	− 2
			<i>typically</i>	(domain+)	+
			ESI		−
					3

Example (13) shows that multiple tokens of the same epistemic stance element—in this case *about*—are counted as contributing multiply to the ESI score. Examples (12) and (13) illustrate two different ways of scoring an ESI of –3. In terms of the received idea of the Two Cultures, scientists should generally score more positively than artists and humanists, since they strive to be objective, and to discover general laws. However, the evidence from the last chapter showed that, although these traits are reflected in evidential verb choice (see review in Section

4.4.2 below), scientists tend to favour weaker modal verbs. It is plausible that the more ambitious epistemic goals of science, as reflected in the ESI components of e.g. relativity and domain, are causally related to scientists' being more cautious in the modal component; indeed all the components of the ESI could be said to be in opposition to each other in this way.

The ESI is a way to capture the linguistic materialization of epistemic stance, which is a discourse-level phenomenon. Stance is compositional, and the ESI is able to capture the combined boosting and hedging function of a wide range of linguistic forms acting in concert. However, it is also a simplification. It assumes that the evidential variables described can be unproblematically classified as strong or weak, whereas there are likely to be finer levels of distinction (see e.g. Coates 1983). Another type of detail not captured by the ESI is the ambiguity of multiple modal elements used together: it could be a single stance multiply modalized on the one hand, or several partially nested stances on the other. These distinctions are often elucidated prosodically, but this will not be explored here. I argue that, despite these limitations, it is appropriate that the first investigation into the relationship between sociolinguistic variation and epistemological variation should start conservatively, since building a more complicated model would also build in further assumptions about the relationship being investigated.

I now turn to the internal variables whose influence on the ESI scores of clausal tokens is being investigated in this chapter.

4.3.2 Main verb type

Main verb refers to the verb that expresses predicative information in some proposition, for example, *schneit* and *snowing* in Examples (3a–d). Auxiliary verbs were coded under modality or tense as appropriate. The evidential verbs examined in Chapter 3 occurred with low token numbers in interview talk—too low to permit reliable analysis. For this reason, the number of verbs included in each class was expanded, as was the number of verb classes. Table 4.10 shows an indicative list of verbs separated into four coding levels (emboldened verbs were included in the analysis in corpus Chapter 3). Every main verb in the interview data was coded in this manner, based on the major semantic domains of Biber *et al.* (1999: 360–71). My *mental* categories also include some examples of what Biber *et al.* class as *communication verbs* (e.g. *argue*) and *existence verbs* (e.g. *look* and *seem*).⁹²

Table 4.10 Main verb types in interview data

<i>Mental</i>	<i>Alethic</i>	<i>show, demonstrate, prove, indicate</i> , <i>hear, listen, look, see, search, observe, detect, find, measure, determine, tell whether, verify</i>
	<i>Epistemic</i>	<i>think, believe, know, infer, expect, argue, claim</i> , <i>interpret, see as, view, visualize, be aware, notice, learn, recognize, remember, imagine, intend, wonder, predict, forecast, estimate, calculate, figure, consider, suspect, feel, perceive, presume, assume, posit</i>
	<i>Affective</i> ⁹³	<i>prefer, like, love, want</i>
	<i>Other</i>	All other verbs
<i>Non-mental</i>		

⁹² Biber *et al.* (1999: 361) base their classification system of verbs on their ‘core meaning (i.e. the meaning that speakers tend to think of first).’ They go on to note precisely the domain overlaps that I exploit here as problems for designing a satisfactory coding system.

⁹³ Notable absences included *hope, hate, suffer, appreciate, blame, and fear*.

The alethic verbs are *factive*, i.e. the truth status of their complements is presupposed.⁹⁴ Mary can *demonstrate* that $2 + 2 = 4$, but not that $2 + 2 = 5$. In contrast, I argue that epistemic verbs cannot be considered factive because they relativize the truth status of their complement to a knower. Mary may *think* or *believe* that $2 + 2 = 4$ or that $2 + 2 = 5$. Whether she could be said to *know* that $2 + 2 = 5$ is less clear. Speakers with a narrow epistemic policy range might be more inclined to dispute that someone could *know* something that is “demonstrably” false, while wide EPR speakers may allow this usage if the knower is sufficiently committed to the propositional complement irrespective of some consensus view of its truth status. It seems then that weak epistemic verbs like *think* are not factive, and that strong epistemic verbs like *know* are factive for Narrow types and non-factive for Wide types. Affective verbs introduce propositions that have fulfilment conditions rather than truth conditions. A person can *prefer* or *like* things irrespective of the actual status of those things in the world. Mary could *prefer* that $2 + 2 = 5$ at the very same time as she *knows* that $2 + 2 = 4$. The intrinsic epistemic content of these verbs then consists of their decreasing factivity/objectivity and increasing subjectivity, along with the orthogonal contribution of their strong/weak modal character (which was not coded for the present analysis, but is included as ‘±’, i.e. a mixed positive and negative contribution to ESI scores, for epistemic verbs in Table 4.11 below).

Evidential verbs were found in Chapter 3 to differ significantly in their frequencies in Arts and Science research articles: alethic verbs (*demonstrate*, *prove*, *indicate*, *show*) were preferred in the sciences, while epistemic verbs

⁹⁴ *Indicate* can be factive or nonfactive.

(*think, believe, know, infer, expect, argue, claim*) were preferred in the arts. This was explained in terms of the greater emphasis placed on objectivity (relativity+) and generality (domain+) in the sciences, i.e. the verbs associate with particular disciplinary practices according to whether that discipline fosters discourses of objectivity and generality or subjectivity and specificity. However, Chapter 3 also revealed that the sciences are more epistemically cautious, using a higher frequency of weak than strong modal verbs, i.e. that the greater claim to generality associates with a weaker claim to certainty (modality–). This latter relationship predicts that affective verbs, which are even more subjective, should associate with even stronger modality than epistemic verbs. It is cautiously predicted that these results will be repeated in the interview data. Table 4.11 summarizes the intrinsic and extrinsic epistemic content of the evidential verb types, broken down by epistemic stance element. *Intrinsic* content is epistemic meaning conferred by the semantics of the verb, or by its denotation, while *extrinsic* is meaning conferred by its patterns of usage, or by its connotation. Alethic verbs have more + symbols than – symbols, i.e. they are predicted to associate with overall more positive ESI scores. Epistemic verbs are more mixed, and affective verbs are predicted to associate with more negative ESI scores.

Table 4.11 Predicted effects of main verb type on ESI

		<i>Alethic</i>	<i>Epistemic</i>	<i>Affective</i>
<i>Intrinsic</i>	modality	+	±	
	relativity	+	±	–
<i>Extrinsic</i>	modality	–	+	+
	domain	+	–	–
	relativity	+	–	–

The distribution of mental verbs in the interview data was too uneven to compare these three levels of mental verb against all non-mental verbs, so they were first examined in a more articulated comparison (with more levels for the non-mental verbs), as well as in isolation, in Section 4.4.1, and then as a collapsed category—mental versus non-mental verbs—as discussed in Section 4.4.2.

4.3.3 Main verb aspectual class

All main verbs were coded as having either *stative* or *dynamic lexical aspect*. Modern (particularly scientific) technical discourse tends to package information in noun phrases rather than verb phrases (see e.g. Biber and Gray 2013). This phenomenon, as well as the historical process of language change from more “verbal” to more “nominal” styles (Wells 1960), are both referred to as nominalization. The following examples from Halliday (2006: 34) illustrate progressively more nominalized versions of the same information.

- (14) a. Glass cracks more quickly the harder you press on it.
 b. Cracks in glass grow faster the more pressure is put on.
 c. Glass crack growth is faster if greater stress is applied.
 d. The rate of glass crack growth depends on the magnitude of the applied stress.
 e. Glass crack growth rate is associated with applied stress magnitude.

Nominalization seems to associate with stative lexical aspect. Example (14a) expresses the relationship between stress and fracture progression with two verbs of dynamic lexical aspect (*crack* and *press*), while *depends* in (14d) and *is* in (14e) are both stative verbs. Stative verbs resist the *continuous* aspect (**The cup was being small*), applying to *imperfective* events, i.e. those that do not terminate

within the time referred to (*The cup was being small until Geoff turned up). On the other hand, dynamic verbs, comprising Vendler's (1967) *activities*, *achievements* and *accomplishments*, are *perfective*, i.e. they terminate within the time of reference (*The cup was sitting on the table until Geoff turned up*). As such, stative verbs are more amenable to generalizations: things that obtain not merely in the time of reference, but at all times. This intrinsic epistemic content (domain+) should make stative verbs associate with the higher ESI scores of the more epistemically certain universal laws and generalizations of science.

Table 4.12 Predicted effects of main verb aspectual class on ESI

		<i>Stative</i>	<i>Dynamic</i>
<i>Intrinsic</i>	domain	+	–
<i>Extrinsic</i>	domain	+	–

As noted in Section 4.3.1 above, main verb type and lexical aspect are not orthogonal variables. Some epistemic verbs are exclusively stative (e.g. *know*, *believe*), some also have a homonymous dynamic version which describes cogitation (e.g. *think*), and some are just dynamic, e.g. *argue* and *discuss* (activities with no fixed endpoint), *realize* (a non-agentive achievement) and *learn* (an agentive accomplishment). Alethic verbs are always dynamic, and affective verbs are always stative.⁹⁵ The distribution of lexical aspect and main verb type was thus highly skewed among the affective and alethic verbs in the interview data (see Table 4.13). In order to compensate for this skew, and also to include lexical aspect in the same model as verb type, it was necessary to bin main verb type into non-mental and mental verbs.

⁹⁵ Affective verbs are undergoing a change in some varieties of English such that it is now possible to say e.g. *I'm liking that T-shirt*, while *I'm knowing that fact* remains impossible in those varieties (for further discussion see Comrie 1976; Binnick 2006).

Table 4.13 Numbers of verbs

<i>Main verb</i>	<i>Dynamic</i>	<i>Stative</i>
<i>Affective</i>	0	233
<i>Alethic</i>	367	0
<i>Epistemic</i>	233	220
<i>Mental</i>	600	453
<i>Non-mental</i>	3987	3230

The effect of mental verb type on ESI is examined in isolation from the effect of aspectual class in Section 4.5.1. The binary binned version of main verb type is then examined in Section 4.5.2, and aspectual class in Section 4.5.3.

4.3.4 Tense

All clauses were coded as being either *past* or *non-past*. The past tense should associate with more positive ESI scores simply in virtue of its meaning. Intuitively, other things being equal, one can be more certain about (recent) past events than about future or currently unfolding events. However, this intrinsic epistemic content of tense is supplemented by extrinsic epistemic content: Myers (1992) notes that the past tense is used in science research articles for methods sections, while the present tense is used for well-accepted facts. The use of the past tense to describe experimental procedures is a distancing strategy, making the text seem more objective, and thereby augmenting its persuasive force for readers who are persuaded by the semblance of objectivity (e.g. scientists). However, the past tense is specific to a time, while verbs marked as morphologically present can serve as “tenseless” verbs for expressing “timeless” truths or general laws (see

e.g. Silverstein 1976: 195).⁹⁶ The extrinsic epistemic meaning of tense then seems to partly oppose its intrinsic epistemic meaning. Extrinsicly, the present tense would be predicted to associate with higher ESI scores compared to the past because of their respective associations with making generalizations (domain+) and being specific (domain–), and also because the present indexes the certainty of universal laws (modality+), suggesting the relative uncertainty (modality–) of the past tense. However, the past indexes detachment/objectivity (relativity+), suggesting that the present indexes subjectivity (relativity–). Both the intrinsic and extrinsic predictions are given in Table 4.14.

Table 4.14 Predicted effects of tense variants on ESI

		<i>Past</i>	<i>Non-past</i>
<i>Intrinsic</i>	modality	+	–
<i>Extrinsic</i>	modality	–	+
	domain	–	+
	relativity	+	–

Since the extrinsic associations of tense with the components of ESI overall favour the association of past tense with lower ESI scores, the overall prediction for extrinsic epistemic meaning of tense is that the past is “less certain” (i.e. associates with more negative ESI scores) than the present. This contradicts the prediction based on intrinsic epistemic meaning. The effect of clause tense on ESI is explored Section 4.4.4.

⁹⁶ This contrasts with the domain component of the intrinsic epistemic meaning of tense—any tense intuitively implies a restriction on the domain of application of the proposition of that tensed clause. In the present data, morphologically non-finite clauses were assumed to inherit the tense of the main verb that they complement.

4.3.5 Subject type

The subject of the main verb of each token was coded as *I*, *we*, *you*, *he/she*, animate *it/they*, inanimate *it/they* and *that/this*, generic *you*, generic *we*, expletive pronoun, or noun phrase. This was based on the standard first, second and third person distinction plus nouns. It was expanded to include generic pronouns, since these seem to have epistemic content; the animacy distinction in the third person, since this might be discipline-sensitive, and expletive pronouns so as to exhaustively classify the clausal subjects of the interview data. Personal pronouns such as *I*, *you* and *we* are intrinsically (inter)subjective, i.e. they anchor the predicative content of a proposition to individuals present in the interaction (relativity–). This might be expected to make them associate with more negative ESI scores. Third person pronouns have a relative distancing effect (relativity+), and generic pronouns can function as generalizers (domain+). Nouns are more distant still, since the object to which they refer is more likely to be novel: the use of pronouns presupposes an already-familiar referent. This intrinsic epistemic content is set against a considerable burden of polysemy: *we* can be used inclusively or exclusively (e.g. *we're getting along fine* versus *we don't like you*); *we* and *you* can be used generically (as in *you can't teach an old dog new tricks*); and expletive pronouns do not refer to anything (e.g. *it's snowing*). Fortanet (2004: 45) notes that the choice between *I*, *we* and *you* also reflects 'levels of attempted rapport and degrees of personal involvement', while Ochs, Gonzales and Jacoby (1996: 332–33) suggest that in interaction *I* and *you* can both refer to either the researcher or the research object or even a blend between these two roles.

Despite this somewhat noisy picture, personal pronouns have been found to pattern in a manner consistent with the broadest epistemological differences between disciplines. Hyland (2001, 2005: 148–49) notes that self-mention (*I, me, my*; and *we, our*) and reader pronouns (*you* and *your*) are less common in research articles in the sciences than in the arts. This would suggest that pronouns would associate with the ESI components characteristic of the Arts (relativity–, domain– and modality+). However, Kuo (1999) and Hyland (1994: 240) argue that the use of pronouns to position the reader and writer with respect to a text is at least as important for pronoun choice as the writer’s epistemological commitments. The fact that scientists are more likely than artists and humanists to collaborate in large groups for example may affect writers’ use of *we* to a greater extent than considerations of readability or epistemological consistency. Biber (2006: 50–51) notes that pronouns are more common in academic speech than writing, and that their tendency to replace nouns with pronouns increases with interactivity, such that “office hours” have the lowest frequency of nouns relative to pronouns. Biber *et al.* (1999: 235) found in the LSWE⁹⁷ corpus that pronouns and nouns are about evenly split in general conversation (with frequencies respectively of approximately 17% versus 13%), while pronouns are rather rarer in academic prose (with frequencies of approximately 3% versus 27% nouns, i.e. a ratio of 1:9). This contrasts markedly with the present data in which pronouns and nouns are in a ratio of 6:1 (see Table 4.20 in Section 4.4 below).

Table 4.15 summarizes the intrinsic and extrinsic epistemic content of the pronoun groups discussed above. Cells for which no prediction is apparent from

⁹⁷ Longman Spoken and Written English corpus (Biber *et al.* 1999).

the literature were completed by opposing the alternative categories. The predictions for the separate pronoun types were then combined, and the noun predictions oppose these.

Table 4.15 Predicted effects of subject variants on ESI

		<i>1st/2nd</i>	<i>3rd</i>	<i>Generic</i>	<i>Pronouns</i>	<i>Nouns</i>
<i>Intrinsic</i>	relativity	–	+	+	+	–
	domain	–	–	+	–	+
<i>Extrinsic</i>	modality	+				
	relativity	–				
	domain	–				

The effect of subject type on ESI is explored in Section 4.4.5.

4.3.6 Talk type

Clausal tokens were categorized as *narrative* or *evaluative*. These were distinguished using Goffman's (1974: 496–559) *participant roles*. The author of some communicative content is the person who chooses which form of words will be used; the animator is the person who delivers this message; while the principal is the person or institution with ultimate responsibility for the message. These roles are often assumed by the same person, but they coincide most clearly in the case of evaluative clauses, where affective language is used to attribute aesthetic or moral qualities to a proposition. Such judgements are imbued with subjectivity because the animator is normally understood to be currently experiencing the

judgement. This means that they are also authoring the content and form of the message, and they are in some sense also acting as principal for the message.⁹⁸

This is in contrast to narrative clauses for which the author and animator are more separated. This includes animation of one's past self, and any events removed in time and/or space from the animator's subjectivity. The extrinsically epistemic content of narrative and evaluative talk should then be expected to associate with the relativity component of ESI, and therefore also with the associated modal components as shown in Table 4.16. However, preliminary quantitative analysis demonstrated the reverse trend ($t = 2.3515$; $df = 506.455$; $p = 0.01908$).

Table 4.16 Predicted effects of talk type variants on ESI

		<i>Narrative</i>	<i>Evaluative</i>
<i>Extrinsic</i>	modality	–	+
	relativity	+	–
	<i>t</i> -test	– 0.09018704	+ 0.02155172

This difference could be due to the dominance of the modal component of ESI. It is unlikely to be accounted for by interactions of talk type with e.g. main verb type since affective verbs (with positive ESI scores) are only marginally more common in evaluative talk:

⁹⁸ This doesn't mean that they are choosing to have a particular affective response in a premeditated manner, but, should they express an evaluation that is not ratified by their employer, society or whichever institutions the speaker operates within (e.g. something held to be immoral or illegal), it will be the speaker and not the institution that deals with the consequences. On the other hand, should they not violate any institutional norms, it may be argued that those institutions are playing the role of principal.

Table 4.17 Distribution of verb types by talk type

	<i>Evaluative</i>		<i>Narrative</i>	
	<i>N (rel %)</i>		<i>N (rel %)</i>	
<i>Affective</i>	17	(3.663793)	214	(2.741481)
<i>Alethic</i>	13	(2.801724)	354	(4.534973)
<i>Epistemic</i>	23	(4.956897)	430	(5.508583)
<i>Other</i>	411	(88.577586)	6808	(87.214963)

To investigate this possibility the 464 evaluative tokens were analysed together with three random samples of 464 narrative tokens. A model containing main verb type, aspectual class, tense and subject type, as well as talk and all its two- and three-way interactions was stepped down for each of the samples (see section 4.4).

4.3.7 Voice

Passive constructions omit the verbal subject, and therefore make more limited knowledge claims than those that specify the subject (irrespective of the subject's semantic role). Intuitively, other things being equal, the more limited one's claim, the more certain one can be of it (modality+). The omission of the verbal subject also reduces the subjectivity of the clause (relativity+). This intrinsic epistemic content of voice is supplemented by extrinsic epistemic content: the passive voice has been previously found to be more common in (more speculative) research articles than in (more consensual) text books (Wingard 1981), i.e. it associates with uncertainty (modality–), and hence more negative ESI scores. Biber (2006: 65) finds an 80/20 split in active/passive voice in textbooks, and 95/5 in academic speech (approximate proportions estimated from graph). This is in contrast to an approximately 98/2 split in general conversation in Biber *et al.* (1999: 476), which

is more or less consistent in classroom talk across the disciplines, while the proportion of passives rises to 30% in engineering texts and is almost as high in the natural sciences. This supports the interpretation that the passive voice performs a similar distancing function to the past tense, enhancing objectivity (relativity+). This means there is quite good agreement between predictions based on the intrinsic and extrinsic epistemic content of voice. However, the fact that the extrinsic modal content is negative, and given that modality counts for 2 out of 6 of the ESI categories (verbal and adverbial modality) whereas relativity only counts for one, the extrinsic epistemic content of voice seems to predict more negative scores for passives and more positive scores for actives, as listed in Table 4.18. The result of a preliminary quantitative analysis is also included ($t = -2.0092$; $df = 159.458$; $p = 0.04621$).

Table 4.18 Predicted effects of voice variants on ESI

		<i>Passive</i>	<i>Active</i>
<i>Intrinsic</i>	modality	+	–
	relativity	+	–
<i>Extrinsic</i>	modality	–	+
	relativity	+	–
<i>t</i> -test		+ 0.05194805	– 0.08649581

The result of the *t*-test is in the direction predicted by the intrinsic epistemic content of voice. To see how robust this finding is, all 154 passive tokens were analysed together with three random samples of 154 active tokens. A model containing main verb type, aspectual class, tense and subject type, as well as voice and all its two- and three-way interactions was stepped down for each of the samples.

4.3.8 Polarity

There is an asymmetry in epistemology and the philosophy of science such that it is impossible to prove a universal law, but it is possible to disprove its negation.⁹⁹ This is the reason why the sciences traditionally express *null* hypotheses which are then *disproved* rather than hypotheses which are proved. This asymmetry amounts to intrinsic epistemic content in polarity, but not in the dimensions considered for the ESI. The role of negative polarity in hypothetico-deductive science would however suggest that Science uses more negative polarity than the Arts. The received idea of the sciences as more objective and more general, and of the arts as more subjective and more particular, would then suggest an extrinsic association of negative polarity with positive ESI scores as listed in Table 4.19. Included too is the result for the category of modality from corpus Chapter 3. This category comprises two separate scores for verbal and adverbial/adjectival modality, and so it may influence the overall score more than the other single categories. Finally, the marginally significant result of a preliminary quantitative analysis is also included ($t = -1.8154$; $df = 860.428$; $p = 0.06981$). The t -test shows that the mean ESI of positive clauses is higher than that of negative clauses, albeit not significantly so.

⁹⁹ A classic example is the sentence *All swans are white* which, to be proved true, would require all swans in the universe to be examined and shown to be the correct colour, which is supposed to be impossible. On the other hand, *No swan is white* can be disproved quite readily. Framing hypotheses in a manner amenable to disproof is widely regarded as a *sine qua non* of scientific method.

Table 4.19 Predicted effects of polarity variants on ESI

		<i>Positive</i>	<i>Negative</i>
<i>Extrinsic</i>	modality	+	–
	relativity	–	+
	domain	–	+
	<i>t</i> -test	–0.07773053	–0.14650538

A model containing main verb type, aspectual class, tense and subject type, as well as polarity and all its two- and three-way interactions was stepped down for each of the samples.

4.4 Results

Table 4.20 shows that the variables described above are rather unevenly distributed in the “naturally occurring” interview talk data. Talk type, voice and polarity are particularly uneven¹⁰⁰, making it unwise to include them as factors in a mixed model. Furthermore, preliminary quantitative analysis revealed that their variants have significantly different mean ESI scores (see discussion of tables 4.16, 4.18 and 4.19 above for *t*-tests), so they are likely to contribute a large amount of noise to the data set. For this reason, a sub-corpus was taken consisting of just the major variant of each of these three variables. This is referred to below as the NAP corpus (narrative talk type, active voice, and positive polarity). The mean ESI values are only significantly different for talk type, voice and polarity, and the statistical tests are reported under the relevant section below.

¹⁰⁰ ‘Particularly uneven’ means worse than the 90/10 split, which Guy (1993) suggests as a cut-off point in order to preserve the statistical power of significance tests.

Table 4.20 Distribution by levels of internal variables in full corpus

<i>Variable</i>	<i>Level</i>	<i>N</i>	<i>(%)</i>	<i>Mean ESI</i>
<i>Main verb type</i>	mental	1051	(12.7%)	−0.07802
	non-mental	7219	(87.3%)	−0.08478
<i>Aspectual class</i>	dynamic	4589	(55.5%)	−0.09370
	stative	3681	(44.5%)	−0.07172
<i>Tense</i>	nonpast	6391	(77.3%)	−0.08152
	past	1879	(22.7%)	−0.09207
<i>Subject type</i>	noun	1224	(14.8%)	−0.05229
	pronoun	7046	(85.2%)	−0.08941
<i>Talk type</i>	evaluative	464	(5.6%)	−0.02155
	narrative	7806	(94.4%)	−0.09019
<i>Voice</i>	active	8116	(98.1%)	−0.08650
	passive	154	(1.9%)	−0.05195
<i>Polarity</i>	negative	744	(9.0%)	−0.14651
	positive	7526	(91.0%)	−0.07773

Figure 4.2 is a histogram showing the frequency distribution of ESI values in the NAP corpus. The data are approximately normally distributed, although there is a slight right skew, and a degree of leptokurtosis. Figure 4.3 is a Q-Q plot which shows that the distribution closely approximates normality in the central region where the bulk of the data are to be found, with a slight sigmoid deviation for more extreme ESI scores (i.e. below -2 or above $+2$). Shapiro-Wilk tests on samples of these data confirm that they deviate significantly from normal ($p < 0.001$). This means that non-parametric statistical tests should be used on this data set. However, parametric tests such as ANOVA can still be informative in cases where data is not normally distributed, provided one is cautious when interpreting them. I will therefore proceed cautiously with parametric tests on these data.

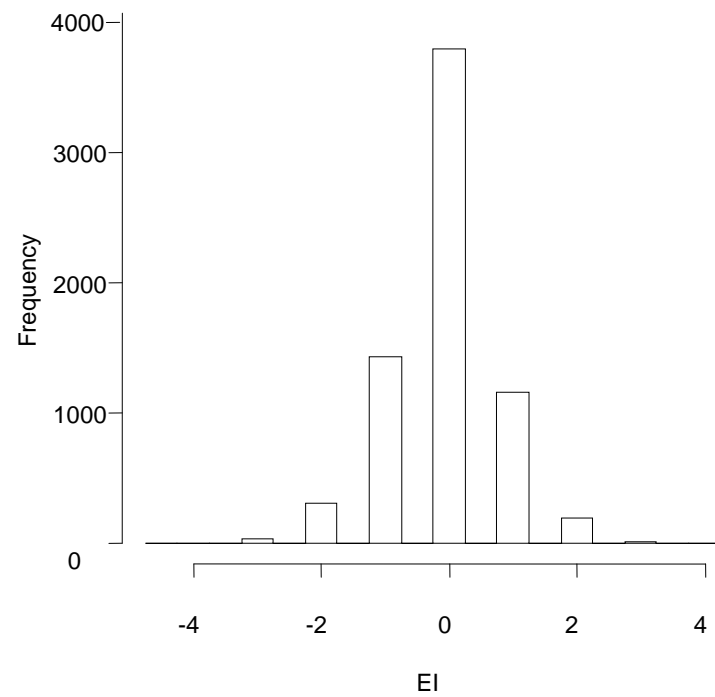


Figure 4.2 Frequency distribution of EI scores in NAP corpus

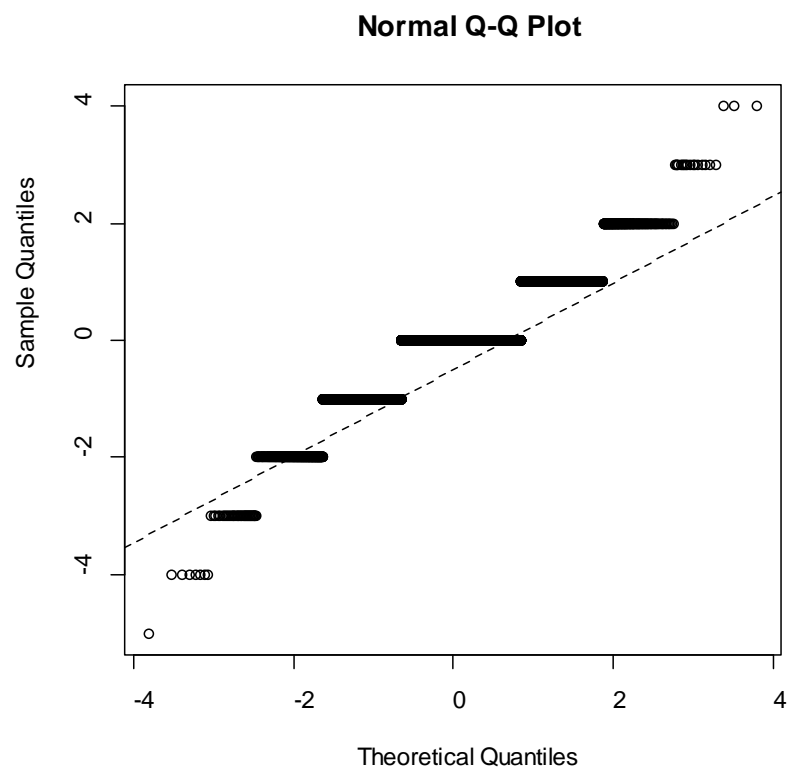


Figure 4.3 Q-Q plot of ESI values in NAP corpus.

There is a wealth of research on the interactions between social categories such as class, ethnicity and gender in conditioning the behaviour of linguistic variables (for discussion see e.g. Milroy and Gordon 2003: 88–92). For this reason, it is standard practice in sociolinguistics to use statistical modelling not merely as a means to test hypotheses, but also to explore which interactions are able to explain more or less of the variation in the dependent variable under investigation (see e.g. Gries 2013: 255–59). This exploratory approach is particularly suited to an initial quantitative study of the linguistic behaviour of a population that has not yet been well characterized. I therefore adopt the standard sociolinguistic practice here of stepping down from models including all 2- and 3-way interactions in respect of all recorded social factors in Chapter 5, and of all recorded linguistic factors in the present chapter.¹⁰¹

A linear mixed model was fitted to the interview sub-corpus data using the R statistical software (R Core Team 2013). Along with the dependent variable (epistemic stance index ESI), four predictors were included (main verb type, aspectual class, tense, and subject type), as well as all their two- and three-way interactions.¹⁰² This maximal model was stepped down by eliminating the third-order interaction with the highest *p*-value greater than 0.05 and re-running the new model until no non-significant ($p > 0.05$) third-order interactions remained. This procedure was repeated for those second-order interactions and main effects not contained in any higher-order interaction. Where a model term was of

¹⁰¹ In both cases, all independent variables will be treated as fixed factors and none as co-variables. This is because the effects of the independent variables are unknown at this exploratory stage. In terms of the statistical package being used to perform the regression, models are built and function in exactly the same way whether variables are held to be co-variables or fixed factors (which is in contrast to other statistical packages, such as SPSS, where co-variables and fixed factors are incorporated into a model in separate steps) (Erez Levon, p.c.).

¹⁰² The four-way interaction was too sparsely populated to be run in R. Furthermore, ‘interactions of an even higher order are extremely difficult to understand’ (Gries 2013:259).

marginal significance (i.e. its p -value would round down to 0.05 if expressed to two decimal places), it was not eliminated from the model. Each time, the new, smaller model was compared to the immediately larger model using a deletion test (an F -test) to check that the model term just removed indeed made no significant difference to the goodness of fit of the model. This procedure is described in Crawley (2007: 323–29).

Tables 4.21 and 4.22 summarize the results of model step-down; the size and nature of the effects are discussed in Sections 4.5.1 to 4.5.7 below.

Table 4.21 Analysis of variance table of type 3 with Satterthwaite approximation for degrees of freedom for final linear mixed model of NAP corpus

<i>Fixed effects</i>	<i>Df</i>	<i>Sum Sq</i>	<i>Mean Sq</i>	<i>F statistic</i>	<i>Denom</i>	<i>p(> F)</i>	
VerbType	1	0.0223	0.0223	2.2542	6950.4	0.133293	
AspClass	1	1.6056	1.6056	7.8327	6953.5	0.005145	**
Tense	1	0.0062	0.0062	2.2813	6960.0	0.130988	
VerbType × AspClass	1	4.7154	4.7154	6.2903	6948.6	0.012162	*
VerbType × Tense	1	2.7798	2.7798	3.7506	6950.0	0.052830	.

ANOVA Table 4.21 shows which variables have a significant effect on the ESI score. In this case, there is a main effect for aspectual class (AspClass), and a significant interaction between main verb type and aspectual class (VerbType × AspClass). To see what contribution each variable level makes to the model, we need more detail than the ANOVA table provides. A linear regression summary table provides this detail for the present model in Table 4.22.

Table 4.22 Regression summary table of final linear mixed model of NAP corpus

<i>Fixed effects</i>	<i>Estimate</i>	<i>Std.Err</i>	<i>t-statistic</i>	<i>p(> t)</i>	
(Intercept)	-0.18439	0.04351	-4.248	2.54×10^{-5}	***
VerbType <i>non-mental</i>	0.09773	0.04167	2.346	0.01903	*
AspClass <i>stative</i>	0.17169	0.06064	2.831	0.00465	**
Tense <i>past</i>	0.14046	0.07714	1.821	0.06869	.
VerbType <i>non-mental</i> × AspClass <i>stative</i>	-0.16222	0.06468	-2.508	0.01216	*
VerbType <i>non-mental</i> × Tense <i>past</i>	-0.15763	0.08139	-1.937	0.05283	.
<i>Random effects</i>	<i>Variance</i>	<i>Std.Dev</i>	<i>REML crit'n</i>	17751.19	
Speaker	0.009304	0.09646	<i>N (obs)</i>	6967	
Residual	0.741161	0.86091	<i>N (speakers)</i>	34	

Table 4.22 shows how various levels of individual variables, and of variables in two-ways interactions, change the value of the ESI that the model estimates. All these changes are relative to the so-called intercept value in the top row, which is the value for the ESI that the model estimates when all the variables are in their default levels. Default levels are the first level in alphabetical order for that variable as listed in Table 4.20.¹⁰³

In the case of aspectual class, stative verbs have an estimated ESI value 0.17169 higher than the default value (dynamic verbs). This is a significant difference, as indicated by the *t*-statistic and *p*-value in the right-hand two columns. However, the presence of a significant two-way interaction between verb type and aspectual class means that the main effect of aspectual class is restricted to just the mental verbs (see following sections for further discussion).

¹⁰³ Where models contain only binary variables, the choice of default level has no effect on model estimates. This is not the case in models including variables with more than two levels, and this is discussed in Section 4.4.1.

4.4.1 Main verb type: Mental verbs only

Initially a 9-way distinction between verb type was made based on my three mental categories, and those of Biber *et al.* (1999: 360–64). Figure 4.4 shows the mean ESI for these 9 categories. The graph was plotted in R using a bootstrap method to estimate confidence intervals. The horizontal lines are the 95% confidence intervals, i.e. they are the range within which one can be 95% sure that the true mean value lies. Since most of the lines overlap, it appears that most of these categories do not have means that are significantly different from each another. Affective verbs are significantly different from alethic and activity verbs. Activity verbs comprise a large, semantically heterogeneous class containing ‘actions and events that could be associated with choice’ and that ‘can take a semantic agent as subject’ (Biber *et al.* 1999: 361).

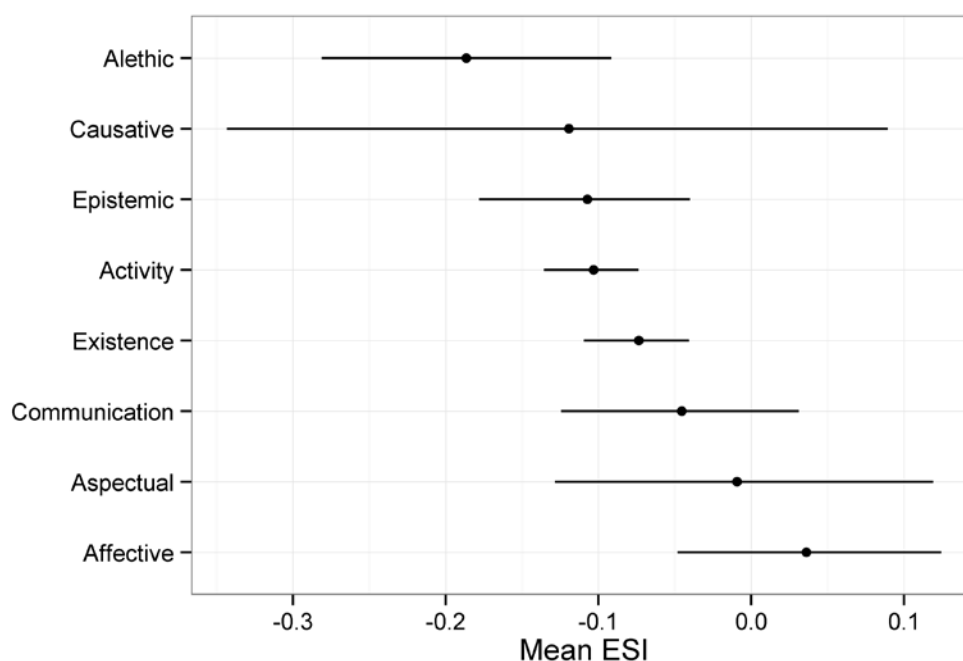


Figure 4.4 Mean ESI of 9 classes of verb

Figure 4.4 shows aggregate means for each verb, so it does not control for other factors. In this section I focus on just the mental verbs (affective, alethic and epistemic), which were included in a new linear model, along with tense, again with ESI as the dependent variable. Subject type was not included due to its highly uneven distribution (6% or fewer pronominal subjects for all mental verbs). Aspectual class was not included since it is non-orthogonal to main verb type (see Section 4.4.2 below). Speaker was included as a random variable.

Table 4.23 Analysis of variance table of type 3 with Satterthwaite approximation for degrees of freedom for final linear mixed model of NAP corpus (mental verbs only)

<i>Fixed effects</i>	<i>Df</i>	<i>Sum Sq</i>	<i>Mean Sq</i>	<i>F statistic</i>	<i>Denom</i>	<i>p(> F)</i>	
VerbType	2	7.3371	3.6685	5.7259	836.64	0.00339	**
Tense	1	1.8118	1.8118	2.8278	834.44	0.09302	.

Table 4.23 shows that verb type has a significant effect on ESI score, while verbal tense has a marginally significant effect. Since this is a small, exploratory corpus, I suggest that it is less appropriate to strictly follow the mechanical procedure of eliminating factors with *p*-values below 0.05. The predictions for tense were mixed, so it may be that some clarification can be gleaned by retaining this non-significant factor in the model.

Table 4.24 Regression summary table of final linear mixed model of NAP corpus (mental verbs only)

<i>Fixed effects</i>	<i>Estimate</i>	<i>Std. Error</i>	<i>t-statistic</i>	<i>p(> t)</i>	
(Intercept)	-0.18649	0.04800	-3.885	0.00016	***
VerbType <i>affective</i>	0.24242	0.07344	3.301	0.00100	**
VerbType <i>epistemic</i>	0.04629	0.06280	0.737	0.46124	
Tense <i>past</i>	0.12154	0.07228	1.682	0.09302	.
<i>Random effects</i>	<i>Variance</i>	<i>Std.Dev.</i>	<i>REML criterion</i>	<i>2055.7</i>	
Speaker	0.006547	0.08091	<i>N (obs)</i>	851	
Residual	0.640696	0.80044	<i>N (speakers)</i>	34	

Alethic verbs have been set as the default level for verb type since the three mental verbs may be thought of as lying on a scale of increasing subjectivity. Alethic verbs are supposed to introduce objective facts; epistemic verbs introduce facts as knowledge; and affective verbs introduce knowledge construed loosely, with or without the factive requirement.

Table 4.24 shows that the behaviour of the mental verbs exactly contradicts the intrinsic prediction summarized in Table 4.11 above: alethic verbs associate with the most negative mean ESI scores. Epistemic verbs are non-significantly higher (+0.05), and affective verbs associate with significantly higher mean ESI scores (+0.24). This result partially supports the extrinsic prediction, which was based on extrapolating the corpus findings about the more objective alethic verbs and the more subjective epistemic verbs to the even more subjective affective verbs. Among the mental verbs, the past tense is associated with a non-significantly higher (+0.12) level of certainty, as measured by the ESI score, than the non-past, following the same trend as in the NAP corpus including all verbs.

I will now examine how the components of the ESI contribute to the model estimates for the mental verbs (Table 4.25) and for tense (Table 4.26). The darker grey panels of Table 4.25 are significant at the level of $p = 0.05$, while those in lighter grey are significant at the level of $p = 0.1$. The ‘composite ESI’ of the bottom row is the same one estimated by the models so far discussed. The ‘component sum’ is the sum of the column of figures above it, which are estimates by the same model of values for the six different ESI components. In other words, the same model was run six times with a different ESI component as the dependent each time.

Table 4.25 ESI component contributions for main verb type

<i>ESI component</i>	<i>Intercept (Alethic)</i>		<i>Epistemic</i>		<i>Affective</i>	
	<i>Estimate</i>	<i>Std. Error</i>	<i>Estimate</i>	<i>Std. Error</i>	<i>Estimate</i>	<i>Std. Error</i>
V–modality	-0.01845	0.02566	0.01500	0.03228	0.02649	0.03775
A–modality	-0.02433	0.01065	0.01497	0.01438	0.01971	0.01681
Domain	-0.07307	0.02639	0.02974	0.03305	0.06510	0.03864
Relativity	-0.01424	0.02172	-0.02337	0.02664	0.06906	0.03113
Comparators	-0.06247	0.01606	-0.00241	0.01865	0.03739	0.02180
Degree	0.00862	0.02151	0.00614	0.02757	0.02706	0.03224
<i>Component sum</i>	-0.18393	0.03102	0.04007	0.01820	0.24480	0.02116
<i>Composite ESI</i>	-0.18649	0.04800	0.04629	0.06280	0.24242	0.07344

The sums of the component estimates are slightly different from the composite ESI scores because the assumptions of the models change when a single component of the ESI is included as a dependent instead of the full composite ESI. For this reason, comparing six different model runs on different components in this way is not strictly meaningful. It does however provide a guide to how much each component contributes to the overall significance (or lack thereof) of the composite ESI score.

Only the relativity component of the affective verb ESI score is significant by itself. Modal verbs and adverbs make no significant contribution to any mental verb's ESI score, or to those of past or non-past tense (Table 4.26). However, the non-significant trends are encouraging for the ESI, and especially for the theory it relies on. In Table 4.25, all the ESI components show an overall pattern of being more positive for affective verbs than epistemic or alethic verbs, and most of the ESI components are more positive for epistemic than alethic verbs (except relativity and degree). This means there is an overall progression from more to less epistemically cautious ESI scores from left to right in the table. The relativity component is more positive for more objective verbs, and the score for objectivity follows the opposite trend to the rest of the ESI components by getting more negative from left to right among the evidential verbs (alethic and epistemic). For the non-evidential affective verbs (*prefer, like, love, want*), this trend is disrupted. The more positive ("more objective") score here suggests that the affective verbs are cancelling the evidential reading of the stance elements in favour of rhetorical reading. In other words, objective variants like *really* and *actually* relate to how knowledge claims join up with the "real" or "actual" external world in clauses containing evidential verbs, whereas in clauses containing affective verbs, they relate to the subjectivity of the speaker, and hence they can be applied less cautiously.

These trends are thus suggestive of different epistemic policies being applied for different main verbs. However, these suggestions are not statistically reliable, and we will explore the effect of epistemic policy shift on ESI score in a more statistically principled manner in the next chapter. A second hint may be

gleaned from Table 4.26. Here the various modal elements are behaving in a more muddled way, being more positive in the past for verbal modality and degree, and more negative for the rest.

Table 4.26 ESI component contributions for tense

<i>ESI component</i>	<i>Intercept (Non-past)</i>		<i>Past</i>	
	<i>Estimate</i>	<i>Std. Error</i>	<i>Estimate</i>	<i>Std. Error</i>
V-modality	-0.01845	0.02566	-0.00271	0.03718
A-modality	-0.02433	0.01065	0.01958	0.01654
Domain	-0.07307	0.02639	0.03005	0.03807
Relativity	-0.01424	0.02172	0.04361	0.03068
Comparators	-0.06247	0.01606	0.03138	0.02149
Degree	0.00862	0.02151	-0.00267	0.03175
<i>Component sum</i>	-0.18393	0.03102	0.11924	0.01907
<i>Composite ESI</i>	-0.18649	0.04800	0.12154	0.07228

4.4.2 Main verb type: Mental versus non-mental Verbs

Mental verbs are present in only 13% of all tokens, so it is not clear how important their contribution is to ESI scores. Furthermore, main verb type and aspectual class are not orthogonal, yet, in order to compare the effects of these variables on mean ESI, it is necessary to include both in the same model. To make this possible, the four levels of main verb type were binned into two: *mental* (*alethic*, *affective* and *epistemic*) and *non-mental* (all other) verbs. Since the resulting mental level will consist of 329 alethics, 330 epistemics, and 192 affectives, one would expect that the behaviour of the mental verbs will be dominated by the alethics and epistemics, and that therefore they should have a more negative mean ESI score than non-mental verbs. ANOVA Table 4.21

revealed that there is in fact no significant difference between the mean ESI scores of mental and non-mental verbs ($F_{1,6950.4} = 2.2542$; $p = 0.133293$). Regression Table 4.22 however shows that the fitted model estimates a significant difference between the lower ESI of mental verbs and the (+0.10) higher ESI of non-mental verbs.

4.4.3 Main verb aspectual class

ANOVA Table 4.21 shows a significant main effect for aspectual class ($F_{1,6953.5} = 7.8327$; $p = 0.005145$). Table 4.22 shows that switching from dynamic to stative class is, as predicted, associated with an increase in ESI (of around +0.17; $t = 2.831$; $p = 0.00465$).

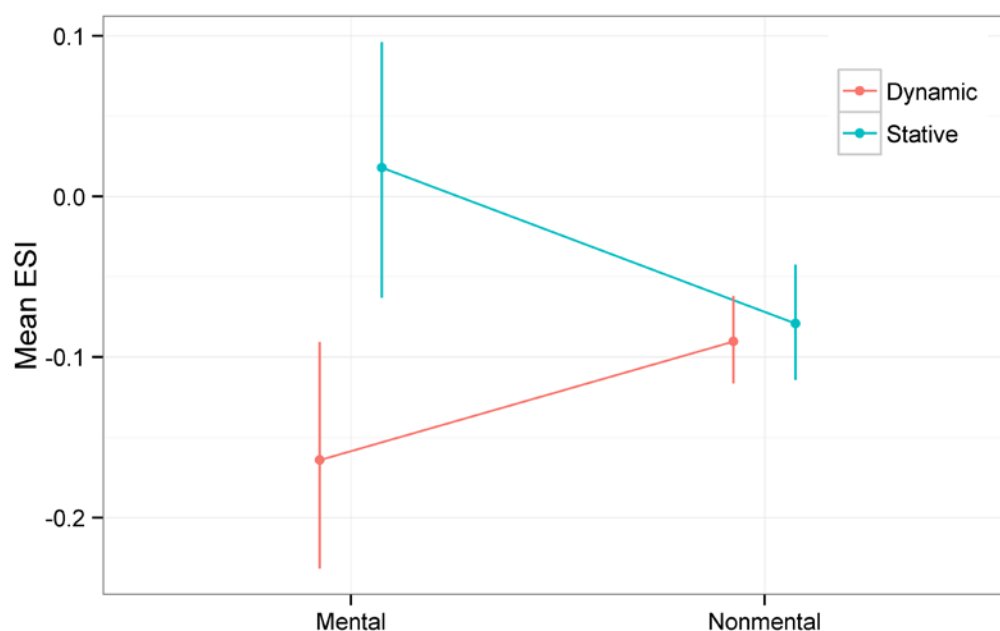


Figure 4.5 Effect of main verb type and aspectual class on mean ESI score

Figure 4.5 illustrates the significant qualitative interaction between main verb and aspectual class ($F_{1,6948.6} = 6.2903$; $p = 0.012162$): while stative verbs have overall higher mean ESI scores than dynamic verbs, it now appears that this is only significant for mental verbs. This is likely to be due to the fact that, while epistemic verbs are split between dynamic and stative classes, all affective verbs (associated with positive ESI) are stative, and all alethic verbs (associated with negative ESI) are dynamic. The non-significance of the difference between aspectual classes for non-mental verbs (see Figure 4.5) suggests that it is actually main verb type that is responsible for the significance of this interaction, not aspectual class. Furthermore, a t -test revealed that the stative and dynamic epistemic verbs do not have significantly different mean ESI scores ($t = -0.9713$, $df = 318.037$, $p = 0.3322$), again suggesting that aspectual class cannot account for this interaction.

4.4.4 Tense

ANOVA Table 4.21 shows that the mean ESI scores of past and non-past clauses did not differ from one another significantly ($F_{1,6960.0} = 2.2813$; $p = 0.130988$). However, Table 4.22 shows that past tense clauses are (non-significantly) higher than non-past ($t = 1.821$; $p = 0.06829$) by about 0.14 ESI units. There is therefore very weak linguistic evidence in support of the prediction based in the intrinsic epistemic meaning of tense: that one can generally be more certain about past events. There is also a marginally significant interaction between main verb type and tense ($F_{1,6950.0} = 3.7506$; $p = 0.052830$), and, as illustrated in Figure 4.6,

mental verbs were more differentiated than the non-mental verbs, although token numbers were lower, leading to larger standard errors. Table 4.27 shows that affective verbs occurred with past tense at a rate comparable with non-mental verbs (24%), while alethic and epistemic verbs were less likely to be found in the past tense (around 16%). This could account for the differentiation by tense of the mental verbs.

Table 4.27 Number and relative frequency (%) of past and nonpast tensed verbs

	Non-past		<i>Past</i>	
<i>Total words</i>	8908		5099	
	N	f	N	f
<i>Affective</i>	146	76.0	46	24.0
<i>Alethic</i>	277	84.2	52	15.8
<i>Epistemic</i>	275	83.3	55	16.7
<i>Non-mental</i>	4659	76.2	1457	23.8

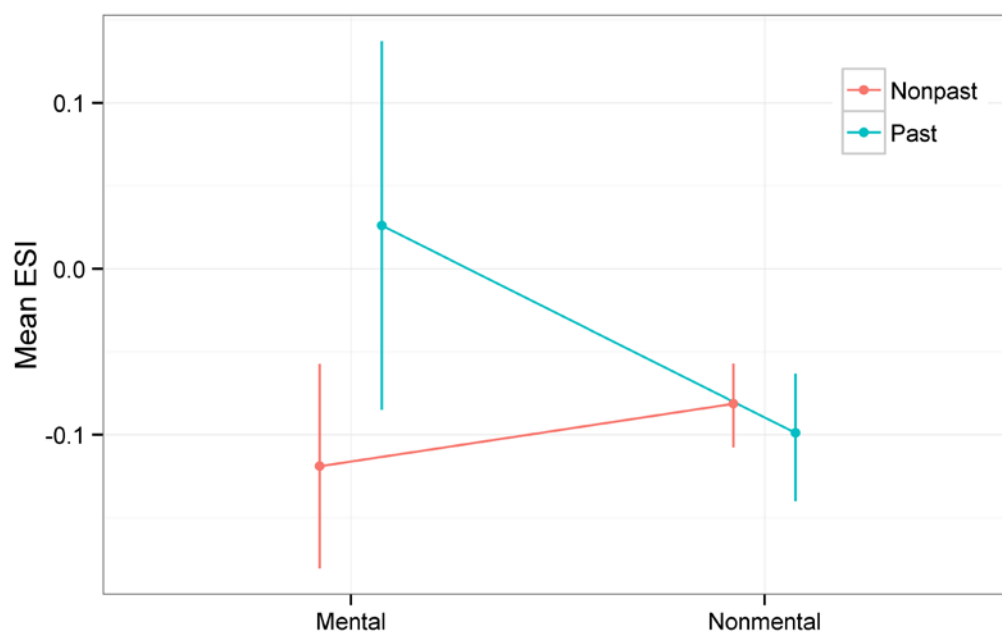


Figure 4.6 Effect of main verb type and tense on mean ESI score

4.4.5 Subject type

Table 4.28 Mean ESI score by subject type

<i>Subject</i>	<i>Mean ESI</i>	<i>N</i>	<i>(%)</i>
I	-0.1109	1862	(36.47)
Excl_we	-0.1533	276	(5.41)
We_generic	0.06061	90	(1.76)
You	-0.1067	64	(1.25)
You_generic	-0.1163	926	(18.14)
3rd_person_inanimate	-0.1201	1504	(29.46)
3rd_person_animate	0.04206	892	(17.47)
Expletive	-0.0977	334	(6.54)
Noun	-0.0523	1019	(19.96)

The tendency across epistemic and disciplinary divisions was to use pronominal subjects in around 85% of clauses. Somewhat unsurprisingly, the data for subject type were rather noisy, as Table 4.28 suggests. No significant differentiation in terms of ESI score was found between pronouns and nouns in this most articulated model or in any principled concatenation of this variable. Subject type was thus eliminated from the models during step-down, indicating that it in fact it is not useful as an explanatory variable in these data, i.e. subject type is not a predictor of mean ESI value.

4.4.6 Talk type, voice and polarity

Table 4.20 showed that talk type, voice and polarity variables occurred with prohibitively uneven distributions, and these variables were therefore controlled during the examination of the remaining variables in all models so far described. Given the significant differentiation between the levels of these variables with respect to mean ESI scores shown in Tables 4.16, 4.18 and 4.19 above, mixed

modelling was attempted with samples that were balanced with respect to these variables. The results were highly variable, likely due to the low token number. An analysis will therefore not be attempted here, and these variables could be investigated in future work.

4.5 Discussion

There is little evidence that the variables considered above make an intrinsic contribution to the ESI, with the exception of mental verbs, which behaved rather differently in the interview data than in the corpus data. This differentiation was masked as a main effect in mixed models where the lexical aspect of the main verb was also included as a variable. This is because the non-orthogonality of these two variables meant that main verb type had to be collapsed into mental and non-mental verbs. The interaction between main verb type and lexical aspect provided evidence that aspect was a less useful predictor of ESI than main verb type. This was despite intrinsic and extrinsic epistemic reasons for expecting stative verbs to have higher ESI scores than dynamic verbs. There was a marginal effect for tense in the predicted direction, suggesting that tense too is a less useful predictor of ESI than main verb type.

Subject type was eliminated during step-down modelling. This is surprising in view of the number of studies in the AE literature that find differential use of personal pronouns in research articles and speech in comparisons between even closely allied disciplines. The more articulated models including the full range of personal pronouns revealed no significant patterns, and

neither did the binary opposition between nominal and pronominal subject. The latter is surprising given different disciplines' patterns of nominalization, and given the widespread practice of constructing arguments by referring to previous parts of text (including speech) with pronouns.

Talk type, voice and polarity were all too unevenly distributed to permit robust analysis, however, *t*-tests revealed significant differentiation in mean ESI for these variables. Narrative talk has a more negative ESI than evaluative talk. The passive voice is associated with higher ESI scores than the active voice, as predicted. Positive polarity clauses had marginally significantly higher ESI scores than negative clauses, contradicting prediction.

Despite the *a priori* plausibility that ubiquitous grammatical features such as pronominal person, lexical aspect, tense and voice should contribute to epistemic stance, there is little evidence here that the ESI is sensitive to their distribution. This may be due in part to their polysemy, however it also hints that the contribution that those internal factors make to epistemic stance is orthogonal to modality, speaker-relativity and generality as operationalized here. In other words, if ESI is indeed capable of capturing epistemological difference, then it is doing so at a different linguistic level than that explored in this chapter. Indeed, if ESI can be shown to track epistemological difference, this would suggest that the linguistic construction of epistemological difference is operating at the discourse level rather than at the level of isolated linguistic variables. This interpretation suggests that the linguistic expression of epistemic stance, i.e. the collocation of particular evidential variants, is a supralinguistic phenomenon. In other words, it suggests that stance elements are composed in response to social epistemological

pressures rather than due to influence from within the linguistic system. In short, style is social. In the next chapter I explore this possibility by investigating how the ESI interacts with external (social) variables.

Chapter 5. Interview Methods and Results (External Factors)

In the last chapter, I developed a novel epistemic stance index (ESI) to operationalize epistemic stance. My interview transcriptions were segmented into clausal tokens, and each token was assigned an ESI score and also coded for a range of internal (linguistic) and external (social) variables. The last chapter analysed the effect of internal variables on ESI score; the present chapter deals with external variables.

A clausal token contains propositional content which we can roughly understand as the “main information to be communicated” by the clause. In addition to propositional content, clausal tokens also contain evidential language which conveys what the speaker thinks about the propositional content *as knowledge*, e.g. whether it is certain or doubtful, universal or particular. I coded six evidential variables, assigning them scores of ± 1 for each variant, and then summed them to get a single ESI score for each clausal token, as exemplified in Table 5.1.

Table 5.1 Summary of ESI components

<i>ESI component</i>	+	–
modal verb	strong <i>must, will, should</i>	weak <i>may, might, could</i>
modal adverb/adjective	strong <i>necessarily, certainly, sure</i>	weak <i>maybe, perhaps, possible</i>
relativity	objectifier <i>actually, in fact, really</i>	subjectifier <i>personally, I'd say, for me</i>
domain	generalize <i>all, generally, always</i>	restrictor <i>particular, some, sometimes</i>
degree	intensifier <i>very, indeed, completely</i>	softener <i>somewhat, a little, fairly</i>
comparator	equator <i>exactly, precisely, equally</i>	approximator <i>roughly, basically, sort of</i>

Higher ESI scores are attributed to stances of greater certainty, objectivity and generality, and lower scores to stances that are more hedged, subjective and particular. In Chapter 4, I investigated whether the ESI is sensitive to internal variables such as tense, voice and lexical aspect, and found, surprisingly, that only main verb type appeared to contribute in a consistent manner to ESI scores. In other words, epistemic stance, as measured by the composite ESI score, is not affected by the grammatical features of the proposition (pronominal person, lexical aspect, tense and voice). The main verb of the proposition did affect ESI scores, with alethic verbs scoring lowest, followed by epistemic and then affective verbs.

In the present chapter I investigate whether the ESI is sensitive to external variables. I apply a novel, epistemologically-grounded, sociodemographic variable based on the notion of *epistemic policy* developed in Chapter 1. Epistemic policies are “ways of seeing” that are shaped by beliefs, values, and attitudes concerning the nature of knowledge. Based on their responses to interview questions, I categorize participants as having a wide or narrow *epistemic policy range* (EPR). I then perform a multivariate analysis of the effect on ESI scores of this novel EPR variable, as well as of affiliation to a particular academic division (Arts/Humanities, Social Sciences, and Science), and the traditional sociolinguistic variables age, sex and native language (L1), as well as institutional affiliation. In addition to these sociodemographic variables, I also include topic as a variable in order to look for linguistic variation within the speech of individuals.

5.1 External variables: Operationalization and coding

Recall from Chapter 4 that 34 interviews (a total of just under 34 hours of recordings) were transcribed, and a subset of these transcripts was segmented into 8270 clausal tokens. Epistemic stance index (ESI) scores were assigned to each clausal token, and I now develop predictions in terms of ESI scores for each of the external variables listed in Table 5.2.

Table 5.2 External variables

<i>Variable type</i>	<i>Variable</i>	<i>Levels</i>
Dependent	ESI	(continuous)
Independent	EPR	narrow, wide
	academic division	arts, humanities, sciences
	topic	autobiography, impact, teaching, subject, research
	sex	female, male
	academic age	younger, older
	institution	Birkbeck, Goldsmiths, Imperial, King's, Queen Mary, UCL
	L1	English, other
Grouping	speaker	34 participants

5.1.1 EPR

In Chapter 1, I reviewed the classical “ordinary-language” analysis of knowledge, namely, that in order to *know* a proposition *p*, you have to *believe p*, and *p* has to be *justified* and *true*. I symbolised this analysis of knowledge as JTB or B(JT).¹⁰⁴

This analysis raises questions such as: Whose language? What is “ordinary”

¹⁰⁴ B(JT) means belief in a justified truth. Justified truths can be called *knowledge* (e.g. knowledge stored in a book), but it would be odd for most people to say that the book *knows* anything. The verb *know*, then, seems to require *belief* by a knowing subject, whereas *knowledge* can exist without a knower.

language? What is belief? What is justification? And what is truth? I argued that the answers to these questions are partially constitutive of an *epistemic policy*. An epistemic policy, then, is an experience filter: a way of seeing and interpreting the world. It comprises a theory of knowledge (e.g. “knowledge is JTB”), and a way of finding things out (e.g. introspection), imbued with values, attitudes and norms. We all have several epistemic policies at our disposal that are each better or worse suited to particular epistemic tasks.

I argue for a linguistically constructed view of epistemic policy. This means that our beliefs and attitudes about knowledge are materialized, or *performed*, linguistically, but also that they are *constituted* by linguistic practice. For example, the forms of talk habitually used in academic disciplines become enregistered as Medical English or Legal English, and those specialist registers make certain ways of knowing possible. Medical English stereotypically depersonalizes patients by referring to them as their disease: *I saw an interesting case of plague today*. This depersonalization may enable doctors to be more objective by abstracting a disease away from its psychosocial context. Unfortunately it can also make patients feel dehumanized or disenfranchised from their own health management. In this case, then, the linguistic expression of the medical epistemic policy of abstracting diseases from patients can be poorly received by patients who do not see their own disease as distinct from their lived experience of it. The slogan “Treat the patient, not the disease” is a reminder to doctors not to fall into this trap, and it is supposed to cause changes in medical practice in order to reduce this epistemic mismatch. This slogan has become popular among clinicians in recent decades as patients become more litigious, e.g.

to protect doctors from being sued for battery. At the same time, the notion of treating patients rather than diseases reflects a move towards personalized medicine in the age of genomics, as well as an increased understanding of the multifactorial nature of disease and health processes. The multilevel patient model is taught to today's medical students, as are the linguistic practices that instantiate that refocused epistemic policy, e.g. the use of open questions in doctor-patient consultations, and the idea of “negotiating” a treatment plan. In summary, registers are the linguistic instantiation of consensus epistemic policy; language produces and reproduces epistemic policy.

It is possible to conceive of a medical doctor applying a holistic, multilevel epistemic policy during a consultation with a patient, and then, having agreed a course of action, switching to an abstract, analytic epistemic policy in order to interpret test results or discuss treatment options with colleagues. It might not always be clear which epistemic policy in one's repertoire is most appropriate in all situations. A doctor might be unlikely to consider an unorthodox course of action like homeopathy, perhaps objecting that “unorthodox medicine” is simply not a medicine: if it worked, then it would be part of the orthodoxy. An alternative position might be to consider a placebo response (i.e. an amelioration in health in response to a simulated treatment) to count as an effective treatment. If a patient were so skeptical of orthodox medicine that the only possible intervention they would consider would be homeopathy, then this might be the best course of action from an orthodox perspective too.¹⁰⁵ Doctors who would consider homeopathy in

¹⁰⁵ Provided one could overcome the ethical problem of deceiving a patient “for their own good”.

addition to the two epistemic policies described above have a wider *epistemic policy range* than those who would never consider it.

Having briefly revisited the concept of epistemic policy, and illustrated what I mean by epistemic policy range (EPR), I now describe how I classified each interview participant according to their EPR. There are at least as many possible epistemic policies as there are people, and epistemic policies are somewhat nebulous entities. They consist of an analysis of knowledge (e.g. JTB), but also a range of other supporting beliefs and values (e.g. *lying to a patient is bad*). I developed a way of measuring epistemic policy range by measuring how participants' judgements about knowledge varied in response to two experimental philosophy scenarios. I also looked at the content of their interview responses, in particular, what they said about the nature of knowledge, especially in terms of their values and attitudes with respect to knowledge. In this way I classified each participant as having a narrow or wide EPR.

I argued in Chapter 1 that the academic consensus analysis of knowledge is JTB. This means that academics will only describe their research output as *knowledge* if it is justified, true belief. Furthermore, justification has to be *internal*, since part of producing knowledge in academia is reproducing the means of production. In other words, knowledge claims have to be justified in order to count as knowledge claims; without justification, claims are mere opinion. This means that researchers must have reflective access to their means of justification: they must know how they know. However, researchers may informally ascribe knowledge in situations where the justification is not available to conscious reflection. The Gettier scenarios below are designed to elucidate this very

distinction: whether a participant is an *internalist* or an *externalist* about justification. Internalists require that, to know p , you have to have mental access to the justification for p . Externalists do not require mental access to justification, and they attribute knowledge as long as p is justified “somehow”. I call this variable view of justification J-policy.

Participants were asked to read these two scenarios at the end of the interview. Their responses are shown in Table 5.3 below.

1. Jill’s Buick (Gettier 1963)

Bob has a friend, Jill, who has driven a Buick for many years. Bob therefore thinks that Jill drives an American car. He is not aware, however, that her Buick has recently been stolen, and he is also not aware that Jill has replaced it with a Pontiac, which is a different kind of American car.

Which word best completes the sentence below?

Bob _____ that Jill drives an American car.

believes doubts knows

2. Truetemp scenario (Weinberg *et al.* 2001)

One day Charles is suddenly knocked out by a falling rock, and his brain becomes re-wired so that he is always absolutely right whenever he estimates the temperature where he is. Charles is completely unaware that his brain has been altered in this way. A few weeks later, this brain re-wiring leads him to believe that it is 71 degrees in his room. Apart from his estimation, he has no other reasons to think that it is 71 degrees. In fact, it is at that time 71 degrees in his room.

Which word best completes the sentence below?

Charles _____ that it was 71 degrees in the room.

believes doubts knows

Some participants stuck to the same response for both scenarios, and some changed. Those that stuck to the same answer throughout have a narrower EPR

because they accept a smaller number of ways of justifying knowledge (J-policies) than those that changed. A narrower J-policy range indicates a narrower overall EPR.

Table 5.3 Participants' responses to two Gettier problems

<i>N</i>	(%)	<i>1. Jill's Buick</i>	<i>2. Truetemp</i>	<i>reliabilism</i>	<i>Int/ext</i>
21	(62)	believe	believe	+	int
4	(12)	believe	know	+	ext
3	(9)	know	believe ¹⁰⁶	–	
2	(6)	either	believe	–	int
2	(6)	believe	either	+	ext
2	(6)	either	either	–	ext

The most common response (62%) was that neither Bob nor Charles *knows* anything, but rather merely *believes* it. This response indicates consistent internalism about justification since, although Bob and Charles are correct, neither of them knows why. Worse still, Bob is correct for the wrong reason: his knowledge is justified by out-of-date information; he is correct now only by accident. On the other hand, Charles (Mr Truetemp) is correct for good reasons: he has a *reliable* mechanism in his brain. He's just not aware that he does.

A J-policy of reliabilism and internalism is required for writing up research. Knowledge claims need to be shown to have been arrived at via a procedure that one can trust to work more generally than just in the production of that one piece of knowledge (reliabilism). Furthermore that justification has to be

¹⁰⁶ This response is surprising because it requires holding that knowing something by accident is knowledge, while knowing it because of a reliable mechanism is not. What the response may indicate is a process of attuning to philosophical scenarios, i.e. that the first scenario was answered naively, while the second was considered as a philosophical "trick" question, and so, more exacting standards of knowledge were applied to it. In this case, too, a shift of epistemic policy is implied.

explicated, so the researcher needs reflective access to it (internalism). All other responses indicate a variable J-policy since they are departures from the research norm.

The classification of respondents according to wide or narrow J-policy range is indicative of wide or narrow EPR respectively, but I allowed this classification to be overridden if wide or narrow EPR was demonstrated elsewhere in the interviews. Below are some examples of where this was the case. After all, J-policy is just one element of the analysis of knowledge, which itself is just one part of the epistemic policy that derives from classical epistemology. Classifying participants purely on the basis of their responses about Jill's Buick and Mr Truetemp would not only leave the classification vulnerable to the influence of "natural language" (by being sensitive to Standard English semantic judgements), but it would also place unwarranted importance on the analytic utility of classical epistemology. I am assuming here that the classical analysis of knowledge as JTB is not quite so central to epistemology as has been historically assumed, so the importance of J-policy should likewise be regarded as just one part of a more nuanced approach to classifying participants. I now illustrate some ways in which I classified participants. Around a third of participants were put into a different category from that predicted by their responses to the Gettier scenarios.

Extract (1) is an interview extract which follows a description by the participant of a cross-disciplinary seminar she attended about encouraging critical thinking in students. She had been surprised to hear a scientist complain about

students who are ‘rigid thinkers’. I asked whether she could identify more or less rigid thinkers in her own discipline.

(1)

there are people who work with one idea for the whole of their lives and don’t. I guess to me the distinction would be between people who are still really happy with the book they wrote twenty years ago or the people who say “god I would write that thing completely differently if I could do it now” erm and that those kind of poles of thinking you know the constant revision of ideas versus the you know I agree with myself twenty years ago like I agree with myself today those are two different ways of thinking which I don’t think you know divide between arts and sciences at all [...] it’s probably a road to a happier life because you’re happy with the things that you’ve done but I fall very much into the other camp where you know I can’t bear the thing I wrote yesterday coz I would write it differently today so I wouldn’t say one’s better or one’s worse but certainly I get one and I don’t get the other so

ARTS.10.F

ARTS.10.F uses quite neutral language to describe the two ‘poles of thinking’, but by placing herself ‘very much into the other camp’, she strongly suggests that disagreement with one’s past self, and hence a wide EPR, is a ‘good thing’. LAW.24.M made the opposite evaluation spontaneously when I asked him how he decided to do a PhD, saying he went from law to sociology of law in order to acquire permanent, cumulative scientific knowledge rather than mutable positive law of legal practice:

(2)

I was already feeling dissatisfied with law. er because I think I always wanted to find a way of erm getting something I thought of as real knowledge and the the hang up I always had with law was that you could learn a set of rules about something and the next day the court of appeal the of the house of lords could say could change the law you know so all you your knowledge on that particular subject could be just blown out of the water because somebody in authority says so says it’s wrong and I go- I was really dissatisfied with that tried to find a way of making law something that would er study of law (what) produced cumulative knowledge and I sort of I got the idea that

sociology might be a good bet to do that erm as a sort of underpinning for law so I could look at law from the outside I could try and look at it as a social scientist

LAW.24.M

LAW.24.M makes a value judgement about knowledge, saying that ‘real knowledge’ is not learning a ‘set of rules’, but that it should be ‘cumulative’.¹⁰⁷

This means that LAW.24.M favours universal truths over contingent, local truths, and I therefore classified him as having a narrow EPR. This contrasts with ARTS.10.F.

If speakers closed down lines of questioning, for example by saying that they had not thought about it and therefore could not comment, then this was considered suggestive of a narrow EPR (although it was not by itself treated as categorical evidence). Alternative responses to unexpected or novel questions were that the participant had not thought about it before, but could speculate. A third group had opinions on these matters that appeared more or less well-rehearsed. I took these three categories of response to indicate progressively wider EPR, since they provided increasing evidence of the participant habitually thinking seriously about issues that were outside of their research expertise, including the epistemological character of their discipline, and its relation to others. The following examples illustrate this with respect to the discipline of geography. Extracts (3) and (4) show participants rejecting the possibility of integrating physical and social geography, while Extract (5) takes the opposite position. In

¹⁰⁷ This point of view contrasts sharply with *legal positivism* which maintains that “the rules” is all that the law, and hence legal knowledge, can consist of. Rather, LAW.55.M is a positivist about the sociology of law: he is concerned with objective knowledge about the process through which laws are constructed and used.

Extract (3), I had just asked the participant to elaborate on his comment that one would rarely see a job advertisement for a “historical” geographer.

(3)

geography's a very strange discipline. you know so you turn up to give a for a job interview give your to give your presentation and if the whole department of any department is there: you've got everything from hardcore natural scientists who spend all their time in the lab or in the field erm through you know people who look more like economists political scientists sociologists through: the full range of the humanities up to people who are you know doing either purely theoretical work or: erm you know working on erm you know performance (bases) and and and you know and culture so you know there's a. it it's: it's hard to in some senses find the sort of coherence erm some of it is very present oriented which means that studies in the past you know are not can be not valued and are certainly not valued in certain erm departments I'd always liked the idea of asking someone who's given something very contemporary “what's the relevance of this for the seventeenth century” you know. coz it seems to me to be a fair enough question

GEOG.22.M

GEOG.22.M calls geography ‘very strange’ because of its epistemological diversity. He also says that ‘coherence’ is hard to achieve, and extract (3) finishes with him inverting what he sees as the typical attitude of physical geographers to his research. This is suggestive that GEOG.22.M thinks that coherence is a good thing, but that it is impossible in geography, and he therefore stakes his position firmly in the social camp. For these reasons, I classed GEOG.22.M as having a narrow EPR. GEOG.19.M makes a similar point even more forcefully in Extract (4) when I asked him about whether the physical and social geographers in his department share common discussion fora:

(4)

different colleagues have very different views about this erm. so. I think probably if you ask my colleagues about my view on it they'd say I'm fervently for a split in the discipline and I'm always the guy who takes the piss out of physical geographers and vice versa erm and that that's partly true you know I to be honest even as an undergraduate I never really got the fact that I could be studying Latin American shanty housing one moment and an hour later be looking at glaciers it just didn't make any sense to me probably coz glaciers didn't make any sense to me what I couldn't see the cross-over for the life of me and people would say geography's great coz it's integrates the human and physical and of course the environment's so important now and and I in the abstract I yes but in reality hardly anyone's doing that. and they may be doing it in certain fields like you know land slippages in you know I can see huge value in that but actually the importance of the physical environment to [my research]¹⁰⁸ really. it's irrelevant you know architectural form makes a difference but that's not what physical geographers look at

GEOG.19.M

Extract (5) is a response to my asking a different geographer whether physical geography is more similar to ecology than to social geography:

(5)

erm yes er. I think there's a continuum heheh so I don't I don't think there's a some people I think would think (that) there's a split in in the discipline and you've human geographers and physical geographers and there's no overlap again I haven't found that and that's because a lot of the work I do is quite applied it affects human beingser it inf it affects the environment in which they live and of course on the social side there's the. er understanding of how people ek exist within their environment whether it's in their houses or oror outside and how in a way they they benefit from that environment or they use that environment so there is a continuum erm but I think if you go to the extremes of the discipline erm there is probably no overlap between them no common language I mean it's geography is an amazing discipline in how broad it is but in the area I'm in with the relevant area of social science I think there is it's a bit like dealing with the ecologists it's understanding where people are coming from and just and just knowing how to order things and how to package them and I think the other thing that is happening now erm probably partly driven by the REF and now need for impact and all the rest of it erm but it means that many people in geography now are focusing on erm societal needs for their work er and in doing that it is very logical to

¹⁰⁸ The research topic was removed as it may identify the participant.

work hand in hand with social scientists to move fields forward? so I think not only am I getting a better understanding of what the social scientists do but they're getting a better understanding of what I do in order to make their social science be founded on fairly solid natural science so

GEOG.39.F

GEOG.39.F is quite hard to gauge from this extract. She says that she has not found a clear separation between social and physical geography in her own research, but she allows that there might be non-overlapping approaches at 'the extremes of the discipline'. Extract (5) ends with her suggesting that social science should 'be founded on fairly solid natural science', which strongly suggests a restricted view of what social geography means in comparison to that held by social geographers themselves. However, given the fact that GEOG.39.F also presents her work to, and collaborates with, engineers, policymakers, as well as academics from nearby but distinct disciplines, I classed her as having a (relatively) wide EPR due to the positive attitude towards epistemological pluralism that this suggests.

I predict that participants classified as having a wide EPR will be more variable in the epistemic stances that they take across different topics. Topics were designed to promote divergent epistemic policies, as discussed below in Section 5.1.3. If a participant has a narrow EPR, then I suggest that they will apply a relatively small number of policies across variable topics. This could correlate with less variable stance-taking behaviour overall, i.e. less variable ESI scores, among the narrow-EPR participants.

5.1.2 Academic division

Perhaps the most important defining aspect of disciplinarity is that of a common object of study, and a shared set of ‘taken-for-granted values, attitudes, and ways of behaving’, i.e. epistemic policies, ‘which are articulated through and reinforced by recurrent practices’, e.g. epistemic stances (Becher and Trowler 2001: 23). As discussed in Chapter 2, disciplines have been analysed as *discourse communities* (e.g. Swales 1990), having a ‘broadly agreed set of common public goals’, and using specialized lexis and genres to achieve those aims. I suggested that these broad common goals are epistemological; that they are epistemic policies of the most fundamental type, restricting the range of epistemic commitments that ‘count’ as legitimate within that discipline. At a smaller social scale, where small groups of individuals come together in mutual engagement, the model of the community of practice is more appropriate. For example, a departmental seminar or a research group reading group. However, these communities of practice are embedded within the epistemological matrix of the discipline, and the linguistic practice of such a community of practice must concord with the discourse of the wider discipline. In short, the academic discourse community is a large, diffuse social structure that reproduces itself discursively, and it is socially and linguistically reproduced by communities of practice whose epistemic commitments are ratified by those wider disciplinary norms. It is for future work to examine how academic communities of practice interface with the sociolinguistic structure at the level of the disciplinary discourse community discussed in the present work.

Members of an academic discourse community have a ‘broadly agreed set of common public goals’, and, I suggest, this promotes distinctive ways of seeing things, or epistemic policies. Furthermore, I argue that these epistemic policies are linguistically constructed: they are produced and reproduced via the taking of (epistemic) stance. In other words, the linguistic features that materialize epistemic stance become a distinctive way of speaking (or writing) for a community of practice centred on a common research object. A disciplinary consensus about how to produce knowledge is then produced and reproduced by the habitual taking of particular epistemic stances, and by habitually avoiding other epistemic stances (e.g. avoiding reliance on anecdotal evidence in medicine). Stances produce and reproduce epistemic policies, and a discipline’s totality of stances produce and reproduce its epistemic policy range.

Institutional infrastructure is another defining aspect of disciplinarity. The establishment of a physical department populated by researchers receiving or generating funding not only facilitates the production of new knowledge—it elevates the status of that knowledge to a level more commensurate with wider academia. In other words, an area of study only becomes a fully-fledged discipline once it is built into a physical university. This makes a disciplinary community even more visible and distinctive than they were as a mere group of like-minded scholars; now they have an official status as Women’s Studies or Biosciences. At the same time, the linguistic materialization of their distinctive set of epistemic stances also becomes distinctive: it becomes enregistered. In other words, disciplinary register is language that has become recognizable as a distinctive way of speaking which is appropriate to the epistemic policies of that discipline.

My interview participants affiliate with six academic disciplines, namely, critical studies, law, geography, economics, physics and mathematics (see Table 4.2, reproduced below as Table 5.4).

Table 5.4 Interview participants' vital statistics

<i>Discipline</i>	<i>EPR</i>		<i>Sex</i>		<i>Native?</i>		<i>Academic age</i>	
	N	W	F	M	Y	N	Mean	SD
Critical Studies	3	3	4	2	5	1	11.5	3.51
Law	1	4	1	4	5	0	22.8	10.76
Geography	4	3	4	3	6	1	16.7	11.54
Economics	3	1	1	3	0	4	11.8	5.12
Physics	6	0	1	5	3	3	15.7	9.05
Maths	5	1	0	6	5	1	16.0	8.85
<i>Total</i>	22	12	11	23	24	10	15.8	8.93

We saw in Chapter 3 that disciplines are not monolithic with respect to their linguistic behaviour. Variability in evidential verb use at the largest scale of academic disciplinary structure (the “Two Cultures”) was recapitulated at smaller scales, within a single discipline in the case of psychology, and also within the sub-discipline of sociolinguistics. I argued that this recursive patterning of epistemic stance variables was related to epistemic policy diversity within disciplines. In short, psychology and sociolinguistics permit a range of epistemic policies, and that range is parallel to the range that exists across the whole of academia. Psychology and sociolinguistics were chosen as test cases precisely because of their epistemological diversity, and in the present chapter I investigate whether this internal structure generalizes to less epistemologically diverse disciplines. A discipline such as law is characterized by a relatively wide EPR

since it contains epistemologically divergent (and possibly irreconcilable) approaches to law such as legal positivism and social constructionism. In contrast, a discipline such as physics is relatively narrow: if you take a social constructionist approach to electronics, then you're no longer "doing physics".

Figure 5.1 illustrates the relationship between academic discipline and EPR.

critical studies	law	geography	economics	physics	maths
Arts		Social Science		Science	
The Arts		Science			

Figure 5.1 The relationship between disciplinarity and EPR

The six disciplines are arranged from wide to narrow EPR from left to right. Critical studies is a constitutively pluralistic research programme. Critical theory aims to interrogate the forces shaping discourse, including research discourse. In other words, critical theory is reflexive since its research focus is partly directed at its own methods and assumptions. Law and geography are "broad church" disciplines that tolerate a range of approaches, but which do not necessarily integrate them. So-called "black letter law" tends to be distinct from the sociology of law, and physical geography tends to be distinct from social geography. The geography Extracts (3–5) above from members of the same department illustrate that responses to intra-disciplinary difference can be quite varied.

Economics is a social science that has taken up critical approaches to a smaller extent than geography. It is rare to find a Marxist economist, let alone a post-structuralist economist. Physics and mathematics are narrower still. During analysis, this six-way disciplinary distinction was collapsed into three academic

divisions: Arts comprised critical studies and law; Social Sciences comprised geography and economics; and Science comprised physics and maths. This is represented by the middle row of Figure 5.1. C. P. Snow's (1959) 'Cultures' are also shown, with The Arts and Science overlapping the social and physical aspects of the discipline of geography. The spectrum of wide to narrow EPRs is represented impressionistically by the gradual shift from grey to white (note that the balance is skewed to wide in The Arts and to narrow in Science).

To summarize, EPR is a property of individuals and of disciplines. In Section 5.2.1, I explained how individuals were categorized as having wide or narrow EPRs. In the present section I have presented a picture of disciplinarity that emerges from individual practice such that disciplines are categorized by the collective EPR of their members. Disciplines in the science division have narrower EPRs than those in the social sciences, and those in the arts have the widest EPRs. Individual members of these disciplines will tend to "match" their disciplinary EPR, but, given the linguistic constructionist model of disciplinarity, they are also able to agentively depart from it and exhibit an EPR that is atypical for their discipline.

I predict that the arts and social sciences divisions will show more variability in ESI scores than the physical sciences. If a division permits only a narrow EPR, then I suggest that its members will apply a relatively small number of policies across variable topics. This could correlate with less variable stance-taking behaviour overall, i.e. less variable ESI scores, in the physical sciences compared to the other divisions. Furthermore, the corpus results in Chapter 3 showed that science journals feature more weak than strong modality, and more

alethic than epistemic evidential verbs. Weaker modality contributes to a more negative ESI score. In contrast, alethic verbs connote objectivity and epistemic verbs connote subjectivity (see Chapter 3). This means that the corpus pattern for evidential verbs, if borne out in the interview data, would predict a more positive ESI score for the physical sciences. It is difficult to predict *a priori* which of these effects will dominate in speech data, although the latter effect was more robust in the corpus analysis of research articles since it showed recursive instantiation in discipline-level sub-corpora.

5.1.3 Topic

Recall from Section 4.4 that my interviews followed the following modular structure:

- A. Research and professional background
- B. Teaching and impact
- C. (Inter)disciplinarity
- D. Experimental philosophy scenarios

Interview responses were coded into five topic areas with distinct epistemic characteristics: impact, teaching, autobiography, subject and research (see Figure 5.2).

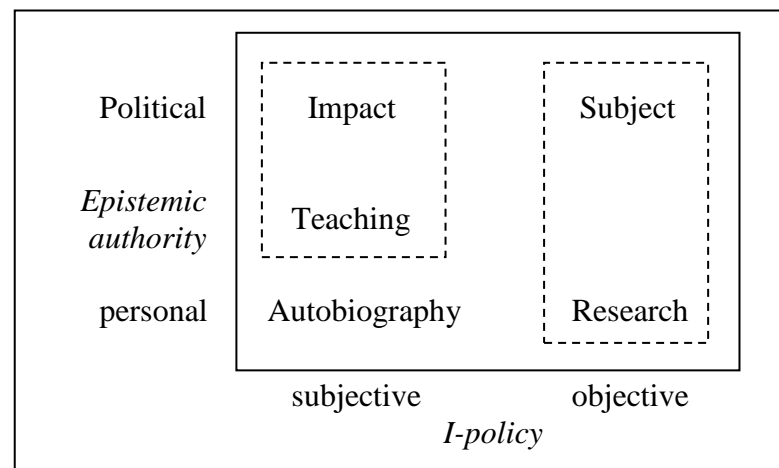


Figure 5.2 The epistemic dimensions of topic

Autobiography is talk about the participant's own life, particularly how they became an academic. *Teaching* covers what courses they teach, and what they think about teaching, students and their misconceptions. *Impact* covers talk about the political funding and measurement of research outcomes, including the RAE/REF. *Subject* refers to established, canonical knowledge claims of that discipline. *Research* refers to the participant's own, more tentative, nascent knowledge claims. I classify the five topics according to two dimensions as shown on the diagram (cf. Levon's 2009 two-dimensional division between narrative/opinion and gay/non-gay topics). The horizontal dimension is I-policy, i.e. investigative policy. This is the epistemic relativity of the researcher to the objects of their knowledge claims: do they make the claim on the basis of their own subjective experience, or is it due to some objective, mind-independent criteria? The vertical dimension on Figure 5.2, epistemic authority, can either derive from the person speaking, or from a political structure such as a discourse community. This means that knowledge claims can be made by individual

academics on behalf of just themselves or on behalf of their discipline. This distinction is not clear-cut, and I will return to Goffman's (e.g. 1974) participant roles to clarify the distinction further.

Recall from Chapter 1 that Goffman proposed four participant roles with respect to a turn in conversation. The *animator* of an utterance is the person uttering it. The *author* is the person who wrote or formulated the utterance. The *principal* is the person on whose behalf the utterance is being made: they are ultimately responsible for the views expressed in it. The *figure* is 'the social persona or 'character type' indexed by the uttering' (Levon 2012: 204). In autobiographical talk, speakers are animating words that they have authored (either during the interview or in the past), and they are the principals of their own life stories. The figure indexed by this state of maximal alignment has been called the speaker's *natural figure*, i.e. figures 'that are the closest to what a person *is* (or desires to be); they are, in essence, acts of identity through which speakers animate a claim to a particular identity category' (Levon 2012: 204; based on Hastings and Manning 2004). Autobiographical speech, then, is assumed here to reflect the participants as natural figures. Speakers can disalign their participant roles strategically, and I argue that this disalignment is the normal case for the other topics in interview. For example, the use of gestural "air quotes" or "eye rolls", prosodic or voicing contrasts, or the use of quotatives or metacommentary can clarify that a speaker's utterance is their own words but that the utterance "follows the party line" with which they agree (i.e. alignment of author and animator, but disalignment to principal). On the other hand, a speaker can use these linguistic means to indicate that what they are saying is a quote from an

official document or an imperative from a senior administrator with whom they disagree, i.e. which they animate while being neither author nor principal of the message.

The topic of impact is a matter of heated discussion in all disciplines. The underlying idea is for funding bodies, and ultimately governments, to be able to establish that research offers value for money. What makes impact contentious is that ‘value for money’ means different things to different people, and there is quite pervasive concern that it will be applied narrowly as short-term, local, measurable economic impact. PHYS.34.M explains that, had such a narrow conception been in operation in the early 20th century, then it would have dismissed quantum theory and general relativity as low-impact blue skies indulgences. He illustrates his point in Extract (6)

(6)

it's actually counter-productive. there was a committee that met very seriously in the early sixties I think it was they came out with the conclusion that the country needed three computers. one for the military one for weather forecasting and one for everything else

PHYS.34.M

When even such clearly economically impactful research is in jeopardy, the position of research with less tangible forms of impact looks quite bleak, as Extract (7) suggests:

(7)

I think there are intellectual rationale for reward impact or consideration of impact in certain cases but to impose it across the board is is very dangerous and what is happening at the moment is absolutely erm. wrong in my view

CRIT.10.F

The majority view among participants on the topic of impact was disdainful, but a sizeable minority were optimistic. In all cases, the epistemic authority for speakers' responses did not rest merely on the shoulders of the individual, but was carried by the academic enterprise as a whole. This political authority and concomitant righteous indignation tended to be expressed as ready-formed or 'soapbox' opinion, which Labov (2001b: 91) describes as the 'extended expression of generalized opinions'. In Goffman's (1981) terms, this means that the speaker is not presently authoring their utterance, rather, the content has been authored in the past. I suggest too that in the case of impact, and to a lesser extent teaching, the author (and possibly principal) is a collective one. In other words, pre-formed stretches of talk about impact and teaching are likely to have been 'worked out' among academic peers. The epistemic authority for talk on the topic of impact therefore goes beyond the individual speaker: it is social or political authority. The following extracts show speakers referring to sources of epistemic authority outside themselves on these matters with the implication that eventually, a definitive definition of impact will be provided from outside.

(8)

I have a problem with it which is. that you can't really use impact as a criterion to decide whether something is good or not because most of the time we don't know what impact what things will have impact because it is like trying to read in the you know the crystal ball you don't know what the conditions of the future will be that will make something produced in the recent past more or less relevant

ARTS.15.F

(9)

I think in as far as I understand how what I understand of the impact is is yeah I mean you're right I mean they're not so much interested in the in the research impact on the research community that's true

ECON.11.M

ARTS.15.F talks in Extract (8) about the meaning of impact being external to her ken, and indeed unknowable in principal without some means of foreseeing the future. ECON.11.M refers in Extract (9) to ‘they’ who are setting the criteria for what would count as impact. ARTS.13.F also refers in Extract (10) to a socially grounded notion of impact which has ‘come on stream’ recently. This phrase implies that impact is an initiative which has been imposed from outside rather than a self-evident notion.

(10)

I I see it as quite a positive term I think it's the difficulty with it is that. it has come on stream so recently that if you if you if you're going to take it on board as part of your kind of picture of what you're doing erm it requires some substantial adjustments and I II don't think they are impossible adjustments

ARTS.13.F

(11)

no I feel it's going a lot of it's going and I'm very disgruntled about it I am extremely critical of the research assessment exercise now (it's) research excellence framework. I did write about this years ago I wrote an article in Times Higher Education supplement when I reported back on no it wasn't the RAE but it was then when they had HEFCE higher education funding council of England when they sent in inspectors colleagues who were meant to be looking at your teaching and I wrote an article about my experience of our HEFCE inspector who came in and listened to me giving my class after a very good lunch where he'd had a little bit too much to drink and he was listening with his eyes shut breathing very heavily and I made that into a story about the value of this I'm extremely I understand completely that one has to decide how to allocate public purse and resources erm I think there are such it's a system point the system has grown too big for itself it thinks it can do what it can't do and what it doesn't understand er I've got no solutions for this but I'm very critical of er of of the R E F I think it's rubbish there we are and I've said it on tape

LAW.39.M

LAW.39.M cites in Extract (11) an example of a failure of government oversight, and concludes with a general statement that ‘the system has grown too big for itself’. In both cases, he implies that impact and performance monitoring in general is doomed to failure: academia is too unwieldy to interface productively with politics as an evaluating force, and it also cannot evaluate itself in the form of an integrated political academia. In all these examples, speakers refer to epistemological limits. Either these are “hard limits”, i.e. unknowables in the future or unknowables implied by the nature of a reflexive system, or they are “contingent limits”, i.e. we just have not got the full picture yet of how this outside influence will play out for us in academia.

Talk about teaching was quite generic; it did not in general deal with discipline-specific pedagogy or recent innovations in teaching practice. Postgraduate teaching qualifications were mentioned by some (especially younger) participants, but this tended to be for the purpose of situating an anecdote on a different topic. Even against the potentially challenging backdrop of the increasing commercialization of higher education, teaching was viewed less emotively than impact, and as more of a legitimate component of the academic profession that had been “signed up for”. The source of epistemic authority on the topic of teaching was either personal or political. In talk changing topic from autobiography to teaching to impact, then, speakers were able to draw on political authority to an increasing extent by disaligning their role as animator from that of author/principal. This produced two contrasting types of figure: the natural figure and the *political figure*. By strategically casting themselves as political figures,

academics were able to epistemically “close ranks”, and share the burden of epistemic responsibility among a wider academic discourse community.

The last two topics were quite different. On the topic of subject or disciplinary knowledge, speakers draw their epistemic authority from the consensus of disciplinary members about the ‘hard core’ (Lakatos 1970) of knowledge and methods, i.e. knowledge that is part of the disciplinary canon, and that, as such, is more objective than the other topics described. This knowledge has been subjected to multiple triangulated interrogations and cross-examinations over many years, and it has been ratified by the community as counting as knowledge. In talk about this consensus subject knowledge, speakers index a *disciplinary figure*. This is an idealized scholarly figure whose epistemic authority derives from the epistemic policies of that discipline. This is in contrast to the political figure whose epistemic authority is largely detached from the content of research proper. Political epistemic authority could for example derive from a democratic vote; disciplinary authority cannot derive in this way.

Finally, the research topic deals with knowledge that is on its way to becoming disciplinary consensus, relying partly on the epistemic authority of the discipline in terms of the theories and methods it uses, but also partly on the epistemic authority of the researcher. In summary, I argue that talk about research puts the speaker in the role of animator and author of their own words. They may also be principals, although among my participants this role would be more naturally ascribed to the research group, department, university or funding body.

The five topics were binned into 3 groups as represented in Figure 5.2 above, where autobiography is isolated, impact and teaching are grouped as

generic academic topics, while research and subject are grouped as *discipline-specific* topics. This was done to make the initial exploration of interactions more tractable: the more articulated model appeared to produce significant interactions with every other variable, and it was not clear if this was meaningful or the result of a noisy data set. Comparisons between all five topics are made throughout this chapter in the extracts of interview talk.

I predict that participants will apply similar epistemic policies to autobiographic talk, treating subjective knowledge justified by personal authority as legitimate. I anticipate a relatively uniform shift towards more positive ESI scores for generic topics (teaching and impact), as participants draw on an academy-wide pool of epistemic resources and therefore are able to sound more epistemically confident. Conversely, I anticipate that participants will diverge on specific topics (subject and research) as they draw increasingly on their discipline-specific epistemic policies, and hence that specific topics will correspond to a wider range of ESI scores.

5.1.4 Academic age

Participants were split into two groups intended to approximately fall either side of a salient career progression milestone: progression to professorship. The average time between gaining a PhD and becoming a professor varies between the disciplines, and depends on exigencies such as flexible working, maternity and paternity leave, budgetary constraints and the personal choices of the researcher. A cut-off of 10 years post-PhD was chosen as a compromise between these

factors: after 10 years, researchers generally begin to become eligible for professorships.

I discussed language socialization in Chapter 1. This is the process whereby a speaker acquires the communicative norms of a community. The degree of competence that a speaker exhibits with respect to community norms, i.e. the extent to which they can ‘pass’ as community members (Bucholtz 1995), depends on how long they have been exposed to, and participating in, that community’s linguistic practices. One would therefore predict that academics would “sound more like” their disciplines if they have spent more years working in them.

In addition to this process of socialization, it is possible that speakers change the way they speak for other reasons. First is the possibility of age grading for reasons other than socializing into a community or acquiring ‘discoursal expertise’ (Swales 1990: 27). In the case of epistemic language for example, it is possible that people generally sound more confident with age. This would give all older participants higher ESI scores across the board. Another possibility is historical change: the meaning and use of the linguistic forms in question could be changing in the English language generally (however defined). If the general tendency in English were towards less confident-sounding ESI scores, then this might be reflected in the academic population too. Thirdly, there could be some combination of socialization, age grading and language change.

Academics may change their epistemic stance-taking throughout their careers, exhibiting age grading of some ESI components, possibly becoming more epistemically confident with experience. This putative age grading in the direction

of higher ESI scores with age agrees partly with Lakoff's (1990: 159) bell-shaped curve discussed in Chapter 4. In particular, Lakoff's suggestion was that PhD-level language is the most formal or most typical of the discipline, while language use becomes less formal with age.

Leech, Hundt, Mair and Smith (2009: 73–75) observe recent historic change in modal verb use. They note a 10.6% fall in core modal frequency¹⁰⁹ in written corpora and 11.8% in spoken corpora between 1961 and 1991. These findings are suggestive of a change in progress, but the decline was least marked in “learned” writing where there was in fact a non-significant *increase* in modal frequency (but almost entirely restricted to *can* and *could*). At the same time, semi-modals such as *have to* and *be going to* have increased at a similar rate, albeit at absolute frequencies too low to account for the drop in core modals.¹¹⁰

Leech *et al.* sketch an explanation in terms of the epistemic policies of academia:

It is difficult to hazard an explanation, without careful qualitative study of the data, of why the Learned sub-corpus bucks the trend in this way. Why should a genre that is otherwise very ‘written’ show an increase of modals, which are favoured by spoken language? In a number of ways, however, as we shall see, Learned writing is more conservative and conformist than other varieties, adhering to fairly strong conventions regarding what are considered ‘decent standards’ in academic communication. One aspect of this is the habitual avoidance of categorical assertions of truth and falsehood. The qualification of such assertions, through modal concepts such as ‘possibility’, ‘necessity’ and ‘likelihood’, is deeply ingrained in academic habits of thought and expression, and might well be on the increase.

(Leech *et al.* 2009: 75)

¹⁰⁹ ‘Core modal’ here means verbs like *must* and *may*, i.e. not morphologically different modal verbs such as *dare to*, and *need/s* (see e.g. Coates 1983).

¹¹⁰ Around 6 times too low in writing, and around 3 times too low in speech.

The possibility that academia is becoming more concerned with making epistemic stance explicit is interesting, and suggests that younger academics may use more epistemic stance elements than their older counterparts, but it is not clear that this should result in more positive or more negative ESI scores.

Leech *et al.* also hint at the possible explanatory role of democratization, suggesting that current political exigencies may disfavour deontic modality which makes power inequality salient. It is not clear why this argument should be restricted to deontic modality (see discussion of modal flavour in Chapter 3). It is likely, then, that modal change is taking place in the UK and US, but that the special epistemic character of academia is resisting this change.

In summary, there appear to be several conflicting language socialization effects possibly operant on the academic population. As they age, they may sound more discipline-typical, or they may relax from the disciplinary standard and become more informal. There is also a possible diachronic process of heightened epistemic language use. This process, if robust, may be being driven by younger or older academics independently, or it may be present across the board.

5.1.5 Sex

Weston (2009) found that UK and US lecturers' sex was a weaker predictor of their pronoun choice, use of tense and modal verb strength than their disciplinary affiliation. That may be borne out here, but the interview context may make intersubjective considerations more important to speakers than would be the case in lectures. In other words, the tension between the use of epistemic language for

politeness rather than for expressing an epistemic stance may be shifted towards the former in interviews.

Research on language and gender has found that, on average, women use more positive politeness strategies than men (for reviews see e.g. Holmes 1995; Holmes and Stubbe 2003). This disparity in linguistic behaviour has been linked to disparity in power. In other words, many women's more polite or deferential language corresponds to their relatively subjugated role in patriarchal society (for review see e.g. Thimm *et al.* 2003). "Women in academia" are also "women in society", so it may be expected that, in taking stances, many female academics will draw more frequently than men on linguistic resources of deference and politeness. These resources are often ones of weak epistemic force including modal verbs (in imperatives such as *could you pass me that?*), hedges, and self-undermining phrases (*I don't know anything about this but...*). It is not clear whether the epistemic use of these forms, which I have argued is especially salient for academics, will tend to down-regulate their use in doing politeness work. If this is the case, then it might be expected that women and men's language will be more disparate at the early stage of their academic careers, and that they will converge as they socialize towards a more exclusively epistemic use of evidential, and away from their use as politeness markers.

This putative levelling of language variation between the sexes assumes that academia is a less patriarchal system than society at large. However, Table 5.4 shows that considerable gender disparity exists in the disciplines, although it has improved markedly in the last decade. Physics and mathematics are the

slowest reformers, and one immediately wonders about the extent of the social practices maintaining that sexist skew.

Table 5.5 Percentage of female academic staff in UK universities¹¹¹

<i>Discipline</i>	<i>2005</i>	<i>2008/09</i>	<i>2010/11</i>
Physical sciences	19	24	25
Mathematical sciences	22	26	27
Social sciences ¹¹²	45	45	47
Humanities ¹¹³	35	38	39
Law	41	47	48
Languages	50	54	56
Creative arts/ Design	39	42	43

This is suggestive that, if a convergence effect is in operation, it will be more marked in e.g. law than in physics, because law seems to be a more egalitarian discipline.

5.1.6 Other external variables

The final two external variables are institutional affiliation and native language (L1). All participants were affiliated to institutions within the University of London, except for 3 at Imperial College London which has been independent since 2007. 4 participants were at King's College London, 2 at University College London, and one each at Birkbeck and Goldsmiths. The majority of participants (23 out of 34) were affiliated to Queen Mary. There are too few participants from most of these institutions to permit meaningful comparison between them. It is possible to compare Queen Mary affiliates to all others, i.e. to examine whether

¹¹¹ Data compiled from Metcalf, Rolfe, Stevens and Weale (2005: 55) and HEFCE report *Staff employed at HEFCE-funded HEIs: Trends and profiles 1995–96 to 2010–11* (2012: 28).

¹¹² The 2008/9 and 2010/11 percentages are for 'Social/political/economic studies'.

¹¹³ The 2005 percentage is for 'Historical and philosophical studies'.

affiliation to Queen Mary corresponds to linguistic practices distinct from other colleges within the University. Queen Mary is distinctive from the other federated colleges in a number of respects. It is in the East End of London, and it draws a large portion of its student population from that area. It is also a campus university, offering on-site accommodation to all first year students. It also places a particularly high emphasis on student experience—particularly in terms of fostering a welcoming atmosphere. All of these factors could contribute to a less formal linguistic environment, possibly characterized by less cautious epistemic language (and hence higher ESI scores).

Everyone interviewed was fluent in English and had had research articles published in English. However, some participants were native speakers of English, and others had learnt it as their second or third language. 10 out of 34 participants had a language other than English as their L1: 4 had Italian, and one each had Brazilian Portuguese, Russian, German, Swedish, French, and Greek. Although it is questionable whether non-natives can be said to form a valid analytic category, there were certainly too few participants of any language other than English to permit statistical treatment of them individually. Furthermore, non-natives will have received explicit instruction about e.g. modality in a way that native speakers will not. I will therefore include L1 as a binary category. The effect of this on ESI is difficult to predict, but it could make participants find modal language more salient, and it could make them more likely to use it in its dictionary use rather than as a bleached discourse marker, or for politeness. If this is the case, then non-natives might use less evidential language in general, and have lower ESI scores than their native colleagues.

5.2 Results

Linear mixed models containing all two- and three-way interactions between the external variables in Table 5.1 were fitted to the interview data using the R statistical software (R Core Team 2013). I explained above, in Sections 5.1.1 and 5.1.2, that EPR and academic division are non-orthogonal categories. Scientific disciplines tend to have narrower EPRs than Arts disciplines. EPR and disciplinary affiliation were therefore included in separate linear regressions.

Table 5.6 shows that the levels of the six external variables were adequately evenly distributed.

Table 5.6 Distribution of external variables by levels

<i>Variable</i>	<i>Level</i>	<i>N</i>	<i>(%)</i>	<i>Mean ESI</i>
<i>EPR</i>	narrow	5280	(63.85%)	−0.10720
	wide	2990	(36.15%)	−0.04281
<i>Sex</i>	female	2709	(32.76%)	−0.11702
	male	5561	(67.24%)	−0.06779
<i>Academic age</i>	younger	2664	(32.21%)	−0.12950
	older	5606	(67.79%)	−0.06225
<i>Institution</i>	QMUL	5663	(68.48%)	−0.08441
	Other	2607	(31.52%)	−0.08285
<i>L1</i>	English	5822	(70.40%)	−0.08193
	Other	2448	(29.60%)	−0.08864
<i>Academic division</i>	arts	2682	(32.43%)	−0.08799
	socsci	2647	(32.01%)	−0.11636
	science	2941	(35.56%)	−0.05100
<i>Topic</i>	biography	1654	(20.00%)	−0.07013
	generic	3347	(40.47%)	−0.07380
	specific	3269	(39.53%)	−0.10125

5.2.1 EPR

I begin in this section with models containing EPR as an external factor, and I substitute division for EPR in Section 5.2.2, where I also compare these two non-orthogonal variables. Age, L1 and institutional affiliation were all eliminated during step-down, and the remaining main effects and interactions are shown in the ANOVA Table 5.7.

Table 5.7 Analysis of variance table of type 3 with Satterthwaite approximation for degrees of freedom for final linear mixed model containing EPR (main corpus)

<i>Fixed effects</i>	<i>Df</i>	<i>Sum Sq</i>	<i>Mean Sq</i>	<i>F statistic</i>	<i>Denom</i>	<i>p(> F)</i>	
EPR	1	2.2283	2.2283	5.9443	29.6	0.020988	*
Topic	2	1.6058	0.8029	0.9024	8247.1	0.405654	
Sex	1	3.4311	3.4311	3.7407	31	0.062289	.
L1	1	0.133	0.133	0.0317	31.6	0.859737	
Topic×Sex	2	7.8483	3.9242	4.8077	8255.8	0.008189	**
Topic×L1	2	8.5509	4.2754	5.5078	8248	0.00407	**

There is a main effect for EPR, and no other main effects. Topic and L1 were retained in the model because those variables participate in two-way interactions. I will return in subsequent sections to these various effects, but will focus on EPR in the present section.

Table 5.7 on the next page is a regression summary, with variables shown in normal type, and levels in italics. Main effects are shown in the upper portion of the table, and remaining two-way interactions in the lower portion.

Table 5.8 Regression summary table of final linear mixed model containing EPR (main corpus)

<i>Fixed effects</i>	<i>Estimate</i>	<i>Std.Err</i>	<i>t-statistic</i>	<i>p(> t)</i>	
(Intercept)	-0.1355	0.056969	-2.378	0.02	*
EPR <i>wide</i>	0.105721	0.043362	2.438	0.021	*
Topic <i>generic</i>	-0.12113	0.047538	-2.548	0.0109	*
Topic <i>specific</i>	-0.01212	0.0487	-0.249	0.8034	
Sex <i>male</i>	0.054953	0.059443	0.924	0.3574	
L1 <i>other</i>	-0.03791	0.059528	-0.637	0.5254	
Topic <i>generic</i> × Sex <i>male</i>	0.113724	0.05601	2.03	0.0423	*
Topic <i>specific</i> × Sex <i>male</i>	-0.02416	0.05668	-0.426	0.67	
Topic <i>generic</i> × L1 <i>other</i>	0.140907	0.058244	2.419	0.0156	*
Topic <i>specific</i> × L1 <i>other</i>	-0.00464	0.058323	-0.08	0.9367	
<i>Random effects</i>	<i>Variance</i>	<i>Std.Dev</i>	<i>REML crit'n</i>	21456.37	
Speaker	0.008442	0.09188	<i>N (obs)</i>	8270	
Residual	0.776246	0.88105	<i>N (speakers)</i>	34	

Table 5.8 shows how various levels of individual variables, and of variables in two-ways interactions, change the value of the ESI that the model estimates. All these changes are relative to the so-called intercept value in the top row, which is the value for the ESI that the model estimates when all the variables are in their default values. Topic was entered with biography as the default level. In this way, the contrast between biography and specific topics (subject and research) and between biography and generic topics (impact and teaching) can be assessed, which correspond respectively to the contrasts represented by the horizontal and vertical axes in Figure 5.2, i.e. I-policy (subjective to objective) and epistemic authority (personal to political). In the case of EPR, the default value is narrow, and the second row shows that a wide EPR corresponds to an estimate of 0.105721, which is a significant value (as indicated by the *t*-statistic and *p*-value in the right-hand two columns). This is the amount by which the estimated ESI value increases for wide EPRs compared to narrow. In other words, the model

estimates that a narrow EPR has a relatively lower ESI, and that a wide EPR has an ESI 0.105721 larger.

The difference in mean ESI of narrow and wide EPRs is shown in Figure 5.3, which is a graph plotted in R using a bootstrap method to estimate confidence intervals. The vertical lines are the 95% confidence intervals, i.e. they are the range within which one can be 95% sure that the true mean value lies. The dot in the middle of each line is the mean ESI aggregated across that EPR category (these are the same values as quoted in Table 5.6).

There is good agreement between the model estimate and the mean aggregate data. Both show wide EPR having a higher ESI, and both indicate that this difference, though modest in absolute terms, is significant at the $p = 0.05$ level.

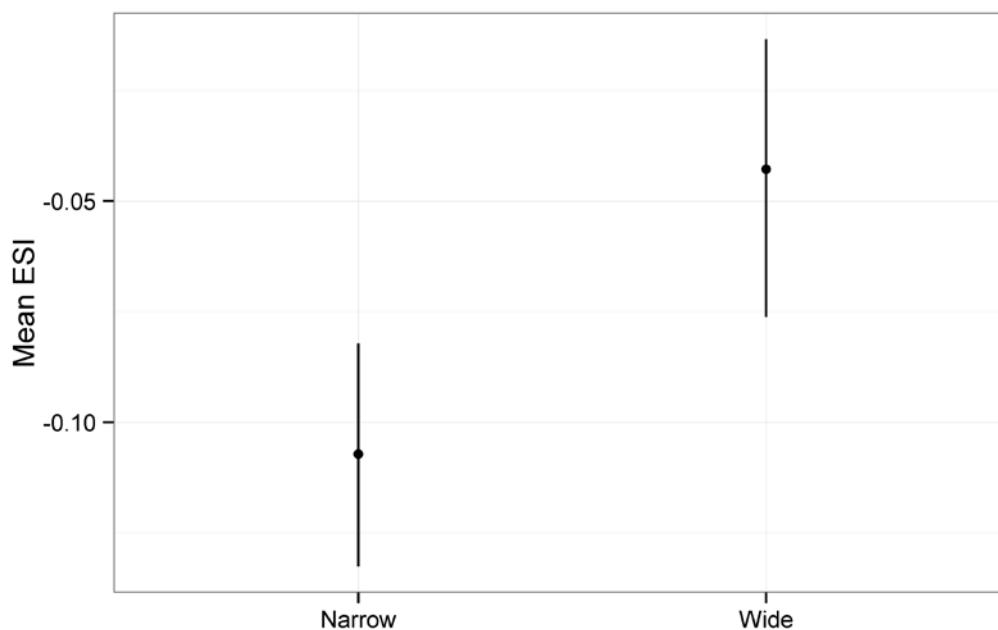


Figure 5.3 Graph of aggregate mean ESI versus EPR

My prediction was that a wider epistemic policy range (EPR) would correspond to a more variable epistemic stance index (ESI). This has not been shown to be the case, rather, a wider EPR corresponds to a higher ESI score than a narrow one. The difference is of the order of 0.1 ESI units. This result agrees with the modal verb behaviour in the “Two Cultures” corpus in Chapter 3. I discuss this result further in Section 5.3 below. In the next section, I perform a similar analysis as in this section, but I use academic division in place of EPR in the linear regression model. I then compare EPR and division before examining the remaining external variables.

5.2.2 Academic division

Table 5.9 shows that academic division and institution were the only significant main effects in its regression model. The remaining external variables were retained during step-down because they participated in two- and/or three-way interactions. For example, even though the two-way interaction between topic and age is not significant by itself, because it is contained within a significant three-way interaction, it must be retained in the model.

Table 5.9 Analysis of variance table of type 3 with Satterthwaite approximation for degrees of freedom for final linear mixed model containing academic division (main corpus)

<i>Fixed effects</i>	<i>Df</i>	<i>Sum Sq</i>	<i>Mean Sq</i>	<i>F statistic</i>	<i>Denom</i>	<i>p(> F)</i>	
Division	2	2.5479	1.2739	10.1752	18.6	0.00104	**
Topic	2	1.6968	0.8484	1.5917	8237.4	0.203645	
Sex	1	0.7498	0.7498	0.0026	18.3	0.960151	
Age	1	1.6418	1.6418	0.5475	20	0.467959	
L1	1	0.0268	0.0268	3.1922	18.6	0.090288	.
Institute	1	0.2011	0.2011	18.7236	19	0.000363	***
Division × Sex	2	1.25	0.625	5.4945	18.3	0.013498	*
Division × Age	2	1.4313	0.7156	11.8465	19.6	0.000427	***
Division × L1	2	0.8775	0.4387	6.3336	18.4	0.008088	**
Topic × Age	2	4.0503	2.0252	2.5158	8235.4	0.080863	.
Sex × L1	1	0.4498	0.4498	9.0155	18.1	0.007615	**
Age × Institute	1	20.6118	20.6118	26.1039	18.5	6.71×10^{-5}	***
Division × Topic × Age	8	18.7905	2.3488	3.0267	8214.2	0.002132	**

There is a significant main effect for division, but it also participates in two- and three-way interactions with sex, age, L1 and topic. Once a higher-order interaction is present in a model, it becomes difficult to interpret its component interactants independently of each other.

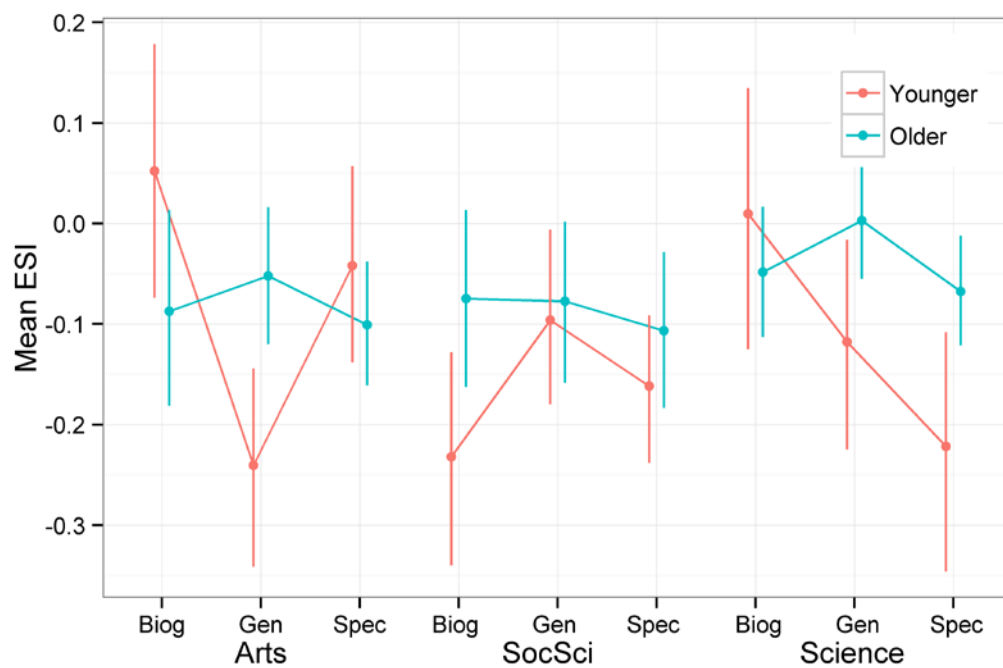


Figure 5.4 Graph of interaction between academic division, topic and age

Figure 5.4 represents the three-way interaction between division, topic and age. The error bars are large, indicating that there is no statistically significant differentiation of mean ESI across the groups, except in the case of academics in the arts division discussing generic topics. In this case, older participants have significantly higher ESI scores than their younger counterparts. This is the source of the significance for division in ANOVA Table 5.9. Regression Table 5.10 indicates that this is indeed the only statistically significant differentiation within this three-way interaction. Given the appearance of the distributions in Figure 5.4 however, one must be circumspect about interpreting this. In particular, although the differentiation between younger and older arts academics on generic topics is statistically significant, the actual mean ESI values fall within the error bars of

several other categories. In short, these data are noisy, and it may be the case that the linear regression is “modelling noise”.

Table 5.10 Regression summary table of final linear mixed model containing academic division (main corpus)

<i>Fixed effects</i>	<i>Estimate</i>	<i>Std.Err</i>	<i>t-statistic</i>	<i>p(> t)</i>	
(Intercept)	0.72116	0.15401	4.683	9.91×10^{-5}	***
Division <i>socsci</i>	-0.43002	0.10458	-4.112	0.000121	***
Division <i>sci</i>	-0.13774	0.22032	-0.625	0.537155	
Topic <i>generic</i>	-0.29367	0.07256	-4.047	5.23×10^{-5}	***
Topic <i>specific</i>	-0.09629	0.07632	-1.262	0.20711	
Sex <i>male</i>	0.07809	0.07023	1.112	0.279971	
Age <i>older</i>	-0.84802	0.15848	-5.351	9.89×10^{-6}	***
L1 <i>other</i>	0.06434	0.12291	0.523	0.6069	
Institute <i>QM</i>	-0.68666	0.13712	-5.008	8.16×10^{-5}	***
Division <i>socsci</i> \times Sex <i>male</i>	-0.24446	0.11214	-2.18	0.042203	*
Division <i>sci</i> \times Sex <i>male</i>	-0.61556	0.1863	-3.304	0.003896	**
Division <i>socsci</i> \times Age <i>older</i>	0.68047	0.14816	4.593	2.49×10^{-5}	***
Division <i>sci</i> \times Age <i>older</i>	0.80678	0.19883	4.058	0.000233	***
Division <i>socsci</i> \times L1 <i>other</i>	-0.62609	0.17592	-3.559	0.002234	**
Division <i>sci</i> \times L1 <i>other</i>	-0.54797	0.19018	-2.881	0.009864	**
Topic <i>generic</i> \times Age <i>older</i>	0.34297	0.09505	3.608	0.00031	***
Topic <i>spec</i> \times Age <i>older</i>	0.0964	0.09787	0.985	0.324693	
Sex <i>male</i> \times L1 <i>other</i>	0.41224	0.1373	3.003	0.007615	**
Age <i>older</i> \times Institute <i>QM</i>	0.63129	0.12356	5.109	6.71×10^{-5}	***
Div <i>socsci</i> \times Top <i>gen</i> \times Age <i>yng</i>	0.41608	0.09986	4.167	3.12×10^{-5}	***
Div <i>sci</i> \times Top <i>gen</i> \times Age <i>yng</i>	0.16522	0.12991	1.272	0.203482	
Div <i>socsci</i> \times Top <i>spec</i> \times Age <i>yng</i>	0.15768	0.10293	1.532	0.125592	
Div <i>sci</i> \times Top <i>Spec</i> \times Age <i>yng</i>	-0.13468	0.13222	-1.019	0.3084	
Div <i>socsci</i> \times Top <i>gen</i> \times Age <i>old</i>	-0.05605	0.08798	-0.637	0.524139	
Div <i>sci</i> \times Top <i>gen</i> \times Age <i>old</i>	0.00305	0.07889	0.039	0.969157	
Div <i>socsci</i> \times Top <i>spec</i> \times Age <i>old</i>	-0.0364	0.08817	-0.413	0.679715	
Div <i>sci</i> \times Top <i>spec</i> \times Age <i>old</i>	-0.01937	0.07854	-0.247	0.805213	
<i>Random effects</i>	<i>Variance</i>	<i>Std.Dev</i>	<i>REML crit'n</i>	21477.33	
Speaker	0.004389	0.06625	<i>N (obs)</i>	8270	
Residual	0.77602	0.88092	<i>N (speakers)</i>	34	

Figure 5.5 shows the aggregated mean values of ESI across the three academic divisions. Social sciences are significantly lower than physical sciences, but both overlap with Arts/ humanities.

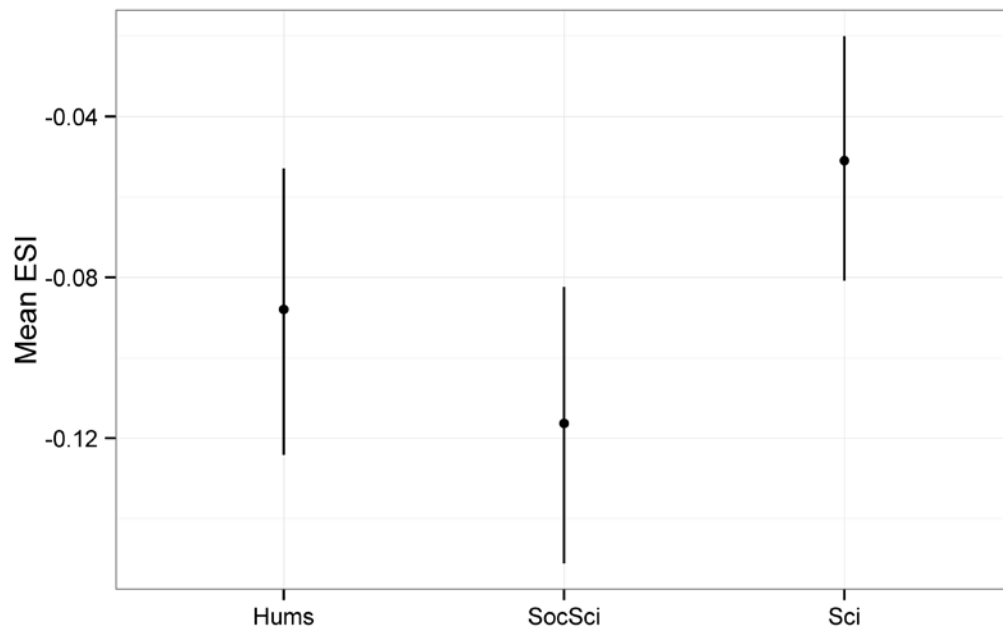


Figure 5.5 Graph of aggregate mean EI versus disciplinary affiliation

These aggregated data illustrate that the significance of academic division is not a main effect but a conditional effect, i.e. its significance in the ANOVA and regression tables (5.9 and 5.10) derives from the three-way interaction of division with topic and age. The arts are distinctive among the divisions because, when discussing generic topics, their speakers are differentiated by age.

Binning the three-way distinction between academic divisions into the Two Cultures obfuscates all internal variability, as shown in Figure 5.6.

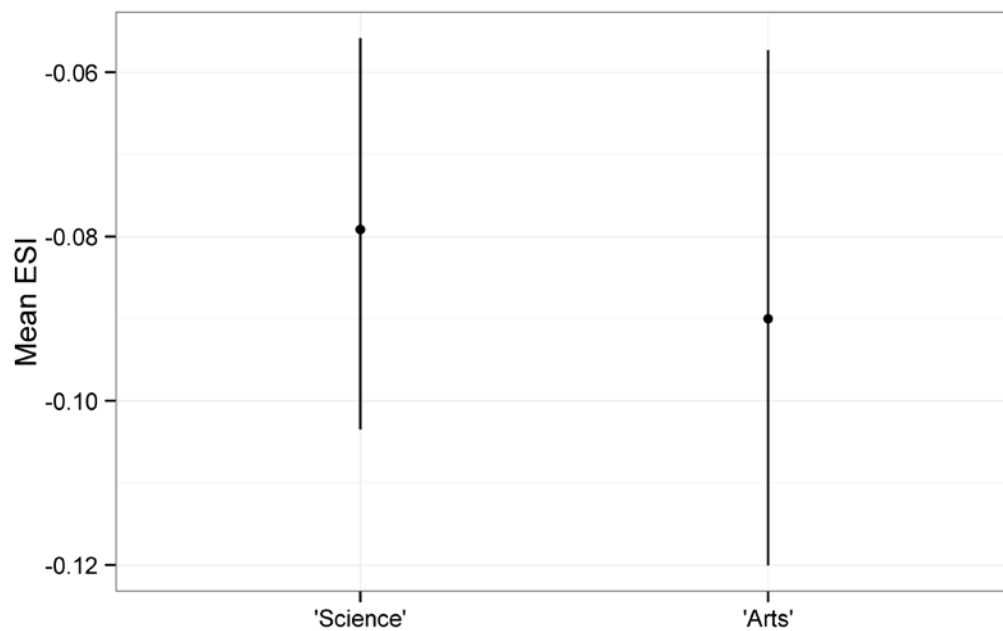


Figure 5.6 Graph of aggregate mean ESI versus “culture”

In Section 5.1.2, I suggested that the arts/humanities, having a wider EPR, would have a wider range of ESI scores. This does not appear to be the case. Rather, there is marginal differentiation between social sciences and physical sciences, with the former having a lower mean ESI score. The model containing academic division contains a three-way interaction for division with topic and age, while the model containing EPR contains only a main effect for EPR. In other words, EPR is a quantitatively more important predictor of ESI than academic division.

The difference in modelled behaviour between EPR and academic division could be due to the same kind of intra-disciplinary differentiation suggested by the corpus analysis in Chapter 3. The model containing EPR showed that wide EPR corresponds to a higher ESI than narrow EPR. If disciplines are, to varying degrees, “broad churches” that contain individuals with both narrow and wide

EPRs, then one would expect any differentiation in ESI score to be obscured by aggregating into disciplines.

Tables 5.11 and 5.12 break the ESI down into its components, and show the relative contribution that each component makes to the mean ESI scores of narrow and wide EPRs (Table 5.11) and the three academic divisions (Table 5.12). Twelve separate regressions were run: one for each component of the ESI for both EPR and division. As a composite of different model regressions, these tables are thus only a guide to the relative contribution of each component to the ESI, although the total ESI calculated from these different models ('component sum') actually agrees quite closely with the model estimates reported in Tables 5.8 and 5.10 (included again here as 'composite ESI'). Only the shaded panels are significantly different from the intercept (light grey panels are marginally significant at $p < 0.1$).

Table 5.11 ESI component contributions for EPR

<i>ESI component</i>	<i>(Intercept) Narrow</i>		<i>Wide</i>	
	<i>Estimate</i>	<i>Std. Error</i>	<i>Estimate</i>	<i>Std. Error</i>
V-modality	-0.00637	0.02203	0.02122	0.01596
A-modality	-0.02591	0.01086	0.00764	0.00770
Domain	-0.04382	0.02231	0.00465	0.01385
Relativity	0.02107	0.03050	0.01803	0.02472
Comparators	-0.09168	0.02406	0.01245	0.02018
Degree	0.01208	0.02689	0.04174	0.02077
<i>Component sum</i>	-0.13463	0.04149 ¹¹⁴	0.10572	0.01334
<i>Composite ESI</i>	-0.13550	0.05697	0.10572	0.04336

Every component is more negative for narrow-EPRs than for wide-EPRs except for relativity (a more positive relativity score means a more objective stance).

¹¹⁴ ESI component sum 'standard error' is the standard deviation of all six components estimates.

This means that narrow-EPR participants use weaker modality, more restricted domain terms (*particular, some*), more softeners (*fairly, a little*), and more approximators (*roughly*); and they also use more objectifiers (*actually, in fact, really*). This concords with Salager-Myer's (1992) claim that 'the more universal the pretension of the claim, the more hedged the discourse'. In other words, in striving to be objective, narrow participants use more cautious evidential language to soften their broader claims. However, these differences are only statistically significant for the shaded panels.

Table 5.12 in contrast shows a slightly more mixed picture in terms of the comparison between physical sciences and arts: the direction of difference in verbal (V-)modality is opposite to that for adverbial/adjectival (A-)modality. This undermines an explanation of modal use that is linked to EPR. Furthermore, although A-modality in social sciences is at a level between the two more epistemologically extreme disciplines, V-modality bucks this trend. With regard to domain, the physical sciences are the most general, the social sciences the least, and the arts at an intermediate position. Relativity, comparators and degree are highest in arts/hums and variably differentiated in the physical and social sciences.

Table 5.12 ESI component contributions for division

	<i>(Intercept) Arts</i>		<i>Social Sciences</i>		<i>Physical Sciences</i>	
<i>ESI component</i>	<i>Estimate</i>	<i>Estimate</i>	<i>Estimate</i>	<i>Estimate</i>	<i>Estimate</i>	<i>Estimate</i>
V-modality	0.08132	-0.04964	-0.04964	0.04788	0.0673	0.10499
A-modality	-0.03947	0.0533	0.0533	0.02348	0.08437	0.05081
Domain	0.00155	-0.01247	-0.01247	0.04504	0.1623	0.08689
Relativity	0.33343	-0.13229	-0.13229	0.06426	-0.24256	0.14918
Comparators	0.07183	-0.15342	-0.15342	0.04271	-0.15298	0.09734
Degree	0.27136	-0.13341	-0.13341	0.0541	-0.05229	0.11987
<i>Component sum</i>	0.72001	-0.42793	-0.42793	0.08219	-0.13385	0.1549
<i>Composite ESI</i>	0.72116	-0.43002	-0.43002	0.10458	-0.13774	0.22032

Again, the general picture is rather noisy when the data are analysed by discipline, and rather cleaner when analysed by EPR. EPR reveals patterns in the ESI components that are harmonic: the value of one component can be explained by reference to the others. This is not the case in the division by discipline, where A-modality and V-modality are at odds, and the social sciences, which would be expected to occupy an intermediate position with respect to stance components is overall more negative than both other divisions. I therefore suggest that EPR reveals the underlying epistemological character of stance by contrasting two internally coherent patterns of stance-taking language. In contrast, an analysis by discipline is unable to do this due to its internal epistemological diversity which materializes in apparently chaotic aggregated stance-taking behaviour.

The following two extracts are from two participants who are both in literary studies, which is allied to the Arts epistemological archetype. However, ARTS.15.M has a narrow EPR and ARTS.10.F has a wide EPR. Their ESI averages for these extracts are almost the same, but they exhibit different patterns of stance taking as evidenced by ESI.

(12) Narrow (ARTS.15.M)	
literary studies is is a <i>pretty</i> fragmented discipline	-1
in the sense that there are <u>so many</u> different theoretical approaches to the subject	+1
which are informed by different <i>often</i> political orientations	-1
which <i>no longer really</i> communicate with each other...	0
and there's <u>very little</u> discussion anymore among those different groups	+1
as to which method is the best one right	0
I mean those discussions are over	0
in the sense there's <u>just</u> you have a position	+1
and you <i>don't necessarily</i> go over to the other side	-1
so <i>I think</i> that's a problem	-1
in the sense that I I still <i>think</i> that a me that a method of interpretation <u>has to</u> prove itself	0
to be the best method	0
or to show that it has that it has cogency in comparison with other approaches to a text	0
and what <i>I would like to see</i> happen is	-1
that <u>there'd</u> be renewed dialogue between different theoretical approaches	+1
<i>Mean ESI</i>	0.07

In Extract (12), ARTS.15.M says of the proliferation of theoretical approaches that 'I think that's a problem'. He also says that these approaches are 'informed by different [...] political orientations' which are serving to isolate approaches from each other. This suggests that he thinks that political convictions should not be allowed to fragment a discipline, i.e. that they should be external to the discipline's theories. Rather, he suggests, interpretations (i.e. ways of seeing the facts) should be compared to others, and should survive on their merits, including 'cogency in comparison with other approaches'. I classed this as a narrow EPR, since it expresses a desire to separate subject matter from context, and to totalize a diversity of theoretical approaches into a single unified framework.

Extract (12) is also instructive in that it shows that researchers are aware of variability (and even competition) in epistemic policy. He implies that a

multiplicity of incoherent policies is a bad thing, and a single big theory made of coherent parts is a good thing. This is a value judgement about epistemic policy range (that narrower is better). ARTS.10.F takes a different view. She suggests, in Extract (13), that individuals can have wide or narrow intrapersonal epistemic policy ranges ('poles of thinking'), and also that the wide/narrow distinction is orthogonal to the arts/science divide.

(13) Wide	ARTS.10.F	
<i>i think</i> there is <u>never</u> and there <u>oughtn't</u> to be a consensus in		+1
these disciplines		
because the way that knowledge works		0
and the way that people yeah the way that that thought works		0
that you <u>never</u> come to a a closed framework or or a poi		+1
you <i>never really</i> come to a point of closure in that sense		-1
so these debates are		0
what makes a a discipline healthy		0
and <i>i think</i> that it's right		-1
so in ten years' time no <i>i think</i> <u>definitely</u> there m there <u>will not</u> be any		+1
consensus		
	<i>Mean ESI</i>	<i>0.11</i>

Extract (13) ends with a remarkably definitive statement against consensus, again couched in values. She says that 'knowledge works' dialectically, and that this negates the possibility of general consensus, and this is 'right'.

The patterns of stance-taking, as quantified by the ESI, are qualitatively different between these speakers. ARTS.15.M, who has a narrow EPR uses positively and negatively scoring epistemic stance elements in very close proximity, so that he "self-corrects" around an average of zero. In contrast, ARTS.10.F uses some repetition and iterative rephrasing to revise her stance, and by doing this she separates out her stance-shifting over more clauses in the

extract. In other words, she seems to take her positively or negatively scoring epistemic stance and discursively emphasize it via repetition, whereas ARTS.15.M, by oscillating more rapidly between positive and negative scores, achieves a more blended stance that gives an overall impression of being more epistemically tentative (cf. Extracts 1 and 2 above; and Section 5.3.1 below).

In the rest of Section 5.2 I discuss the remaining main effects and interactions in the EPR model (Tables 5.7 and 5.8 above), and I set aside those revealed in the academic division model as possibly spurious, and in need of further investigation elsewhere.

5.2.3 Topic

Table 5.7 showed no group-wide significant main effect for topic, although there were significant differences between *Biography* and *Generic* topics (see Table 5.8). These within-group differences are, possibly, conditioned by a further significant interaction with sex and L1. I take a detailed look at the shift in ESI score by topic in one speaker in Section 5.3.1. Figure 5.7 shows how the aggregate mean ESI values across topics diverge from the values shown in regression summary Table 5.8. The interaction with sex and L1 are discussed in their respective sections below.

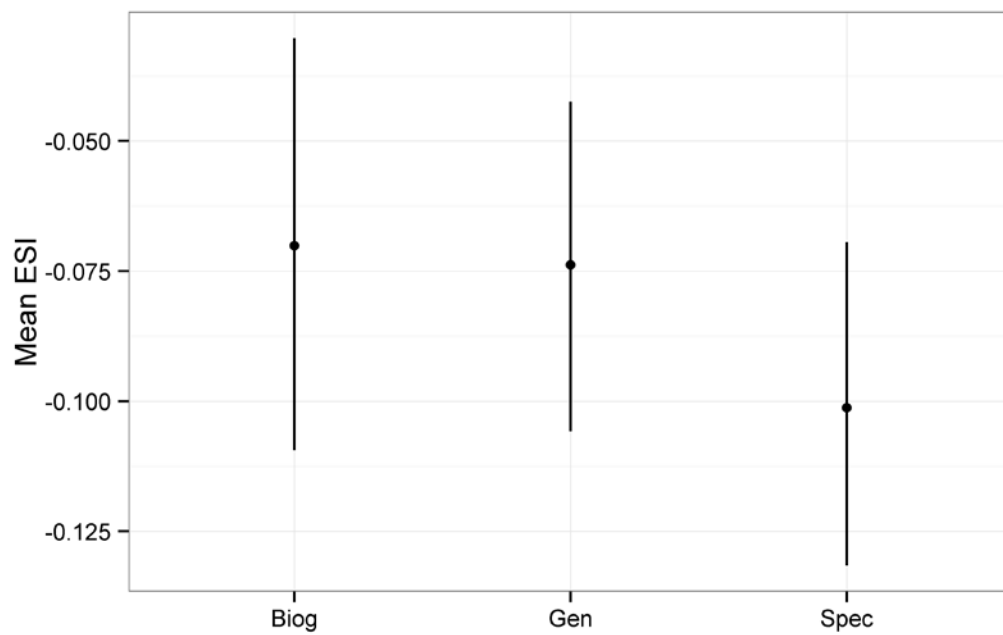


Figure 5.7 Graph of aggregate mean ESI versus topic

5.2.4 Academic age

Age was eliminated as a variable during step-down. There was no significant main effect or interaction for age. This means there is no quantitative evidence of a socialization effect, age-grading or of diachronic change.

5.2.5 Sex

There was a marginal main effect for sex (see Table 5.7), and this is illustrated in Figure 5.8.

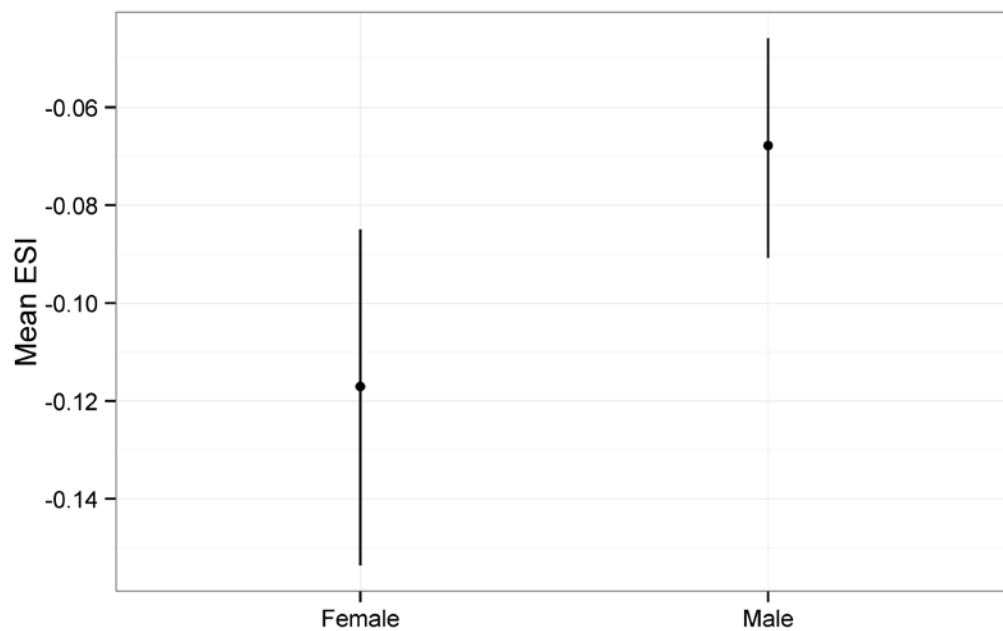


Figure 5.8 Graph of aggregate mean ESI versus sex

There was a significant interaction between sex and topic such that men had higher ESI values than women on generic topics. The sexes were not significantly differentiated on the topics of autobiography or specific topics (research and subject content). The linear regression Table 5.8 shows that there was a significant differentiation is $+0.113724$ ESI units, i.e. it is of the same approximate size as the difference between narrow and wide EPRs (see Figure 5.9 below).

Recall from Section 5.1.3 above that I classed autobiography and generic topics (impact and teaching) as promoting a more subjective investigative policy, and specific topics (research and subject) as promoting a more objective I-policy. This means that on generic topics, one can act as the source of one's opinion, whereas on specific topics, one needs to refer to objective standards of evidence to support one's position. In both cases, speakers can draw on personal or political

epistemic authority (see Figure 5.2). Personal authority means that one has found it out oneself, while political authority relies on matters of consensus within some relevant community. The difference between generic topics and specific topics, I argued, is that the community to which one refers for epistemic authority is wider academia in the case of generic topics, and one's own discipline in the case of specific topics.

Figure 5.9 shows that speakers do not differ much across topics except in the case of generic topics, where men have markedly higher mean ESI scores than women. I suggest that this is because women and men are deferring to a gendered order of knowledge for generic topics. In other words, wider academia still prejudices against women in many disciplines, and in terms of the number of heads of department, executive positions, and presidents of learned societies.

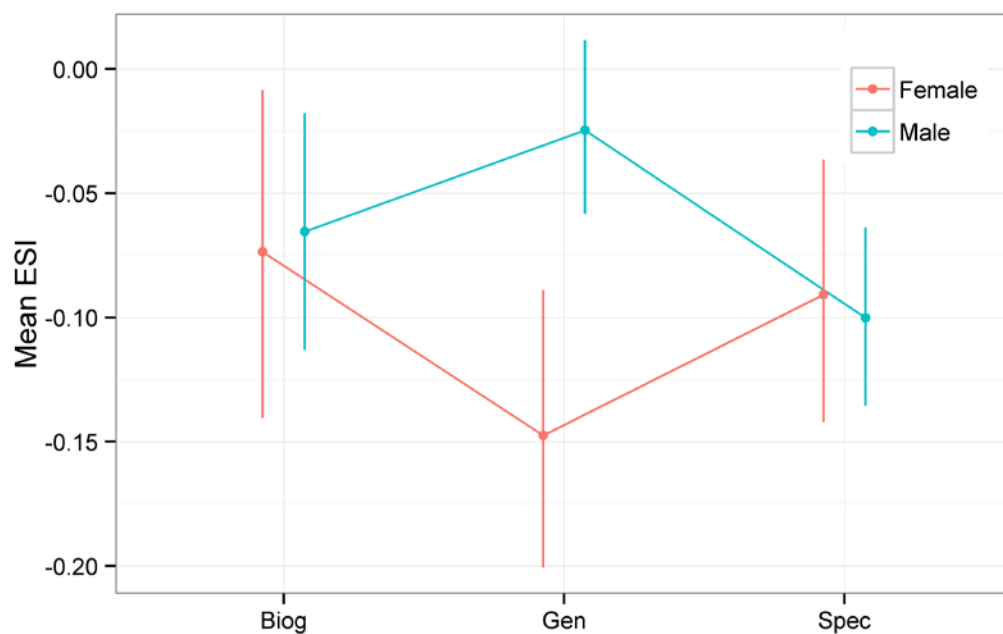


Figure 5.9 Graph of interaction between topic and sex

Table 5.4 above showed that in 2010 only around 25% of academic staff in UK maths and physics departments were women, this was 40-50% in arts/humanities, and 45% in social sciences. Figure 5.10 shows that it is only within the social sciences that men and women differentiate significantly on their generic topics, with women's mean ESI scores being about -0.2 lower than men's. This is suggestive that, even if the actual internal structure of a discipline does not reflect the balance of sexes found in wider society, men and women may orient towards their discipline as if it did. In other words, the men and women interviewed may tacitly view disciplinary knowledge as relatively gender-neutral, and academy-wide knowledge as more mired in hegemonic patriarchy. This speculative explanation is difficult to reconcile with Figure 5.10 where, in Science, women have more positive ESI scores than men across the board. Indeed, it is social sciences that carry the interaction illustrated in Figure 5.9. Further research is required to establish whether there is ethnographic support for speakers linguistically maintaining a gendered epistemological system in the academy.

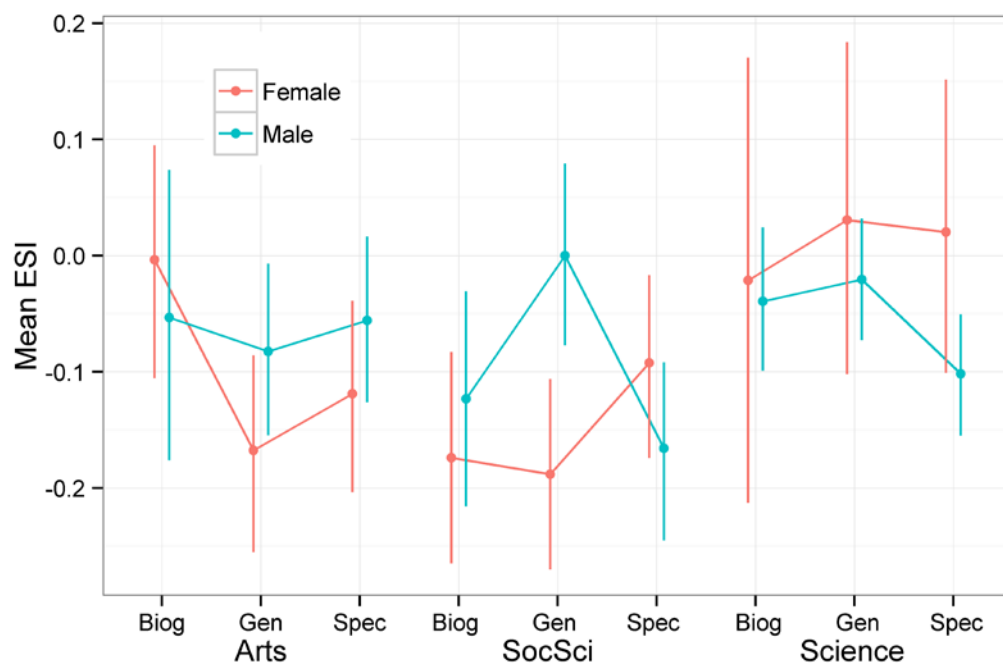


Figure 5.10 Graph of interaction of academic division, topic and sex

A further complication is that my presence as a male interviewer reproduces a participation frame within which power is unevenly distributed: I ask the questions, and the participants are unaware of the overall direction of the interview, or of the subtext of my questions. It is possible that men and women responded differently to this participation frame, being generally able to adjust their position to achieve a more equal footing on matters of their expert knowledge (subject, research and their own life stories); but being less able to do so in response to my questions about generic topics (teaching and impact). These topics are especially potent topics within academia that may have a general role in reproducing gendered power hierarchies.

5.2.6 Other external variables

Institution was eliminated during step-down. There was no significant main effect for L1, as illustrated in Figure 5.11. Speakers with languages other than English as their L1 contributed to a slightly more varied range of ESI scores, as evidenced by their larger error bar in the graph. There was no aggregate effect from any explicit instruction received in the use of evidential language in English.

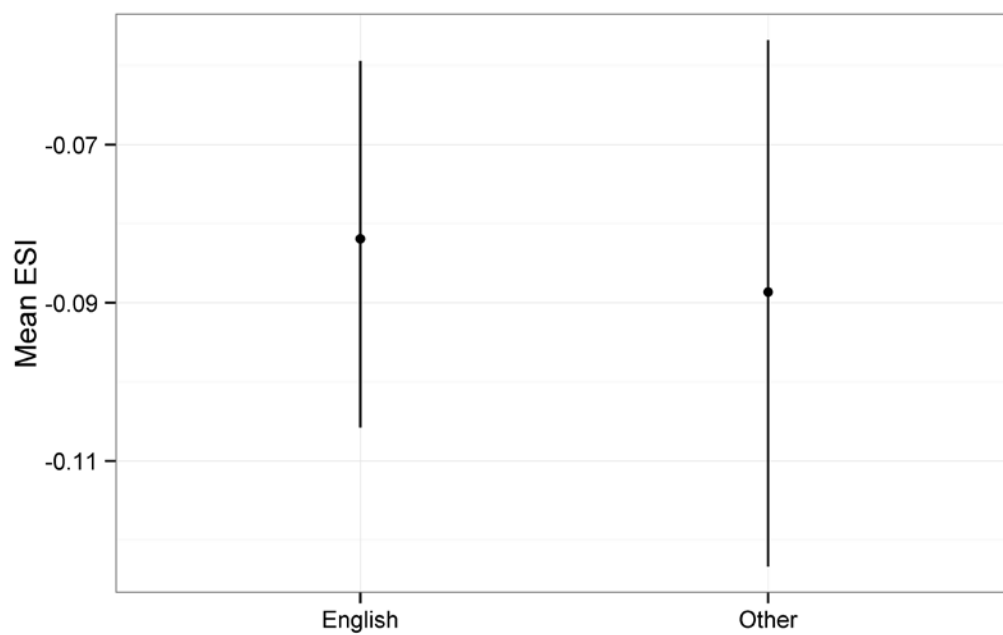


Figure 5.11 Graph of the effect of topic and L1 on ESI

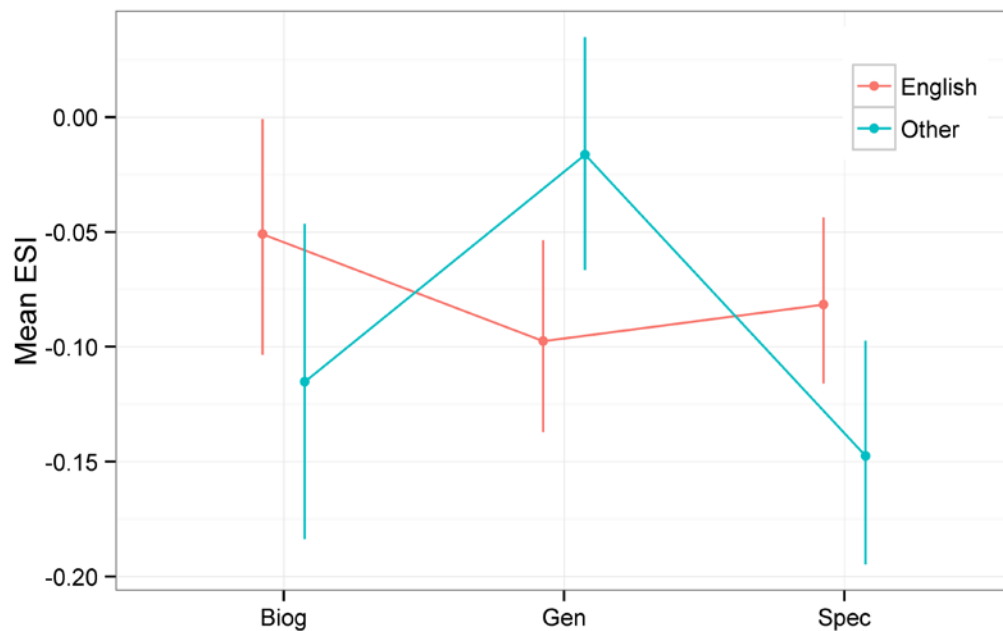


Figure 5.12 Graphs of interaction between topic and L1

Figure 5.12 shows that non-native speakers of English have significantly higher ESI scores when discussing generic topics than specific topics; they are more epistemically cautious about discipline-internal topics. They do not differ significantly from natives on any individual topic area however; their overall amount of topic-linked shifting is just greater. This may be the result of an exaggerated attention-paid-to-speech effect, where non-natives are egregiously attentive about their professional language. PHYS.12.M, who is Russian, notes in Extract (14) that modal language can be used in a variety of ways depending on context.

(14)

so let's say must depending on who said and on the context said it's the same word but er it it really can go anything from ought to or I would advise you to er to to real must but then advise there is a special form 'I would advise you to' which which people can use if they want to but then again if if somebody of er let's say er er a powerful Russian man tells me and I was (working there) let's say I'm working in a Russian department somewhere if he would tell me 'I would advise you to' that sounds even hh more than advise so hh

PHYS.12.M

5.3 Discussion

Epistemic policy range and academic division were included in separate linear models, and, while both were significant as main effects, only EPR was unconditional. A wide EPR was associated with a higher epistemic stance index score, around +0.1 ESI units higher than the mean score for participants classed as having a narrow EPR (see Table 5.8 above). I suggest that this higher score for wide EPR speakers is due to less strict knowledge criteria. Speakers with wide EPRs are able to vary their epistemological commitments to a greater degree than speakers with narrow EPRs. This means, I suggest, that their conception of knowledge becomes more permissive within any given assumed policy, since they are more habituated to taking multiple perspectives.

This ESI difference between narrow and wide EPR speakers is composed of the coherent behaviour of all the component elements that make up the ESI score (see Table 5.11 above). In other words, verbal and adverbial/adjectival modality, domain, comparators and degree all have relatively positive scores for wide-EPR speakers, connoting greater strength of commitment to propositions of greater generality. The relativity component was oppositely directed to this trend,

being more negative for wide-EPR speakers. This connotes greater investigative subjectivity rather than objectivity. Although the composite ESI scores of narrow and wide-EPR speakers were significantly differentiated, only the degree component was significantly differentiated by itself. In short, speakers who take more objective stances are correspondingly more cautious (modally weaker and more restricted) about their claims. The overall effect of this greater caution is to overall achieve a more negative ESI score, i.e. they do not perfectly cancel out the epistemic strength of their objective language, rather, they overshoot into negative scores that connote a marked level of caution compared to a “bald” statement or a “neutral” stance.

Note that a narrow EPR does not automatically indicate an objective I-policy. It is possible to be narrowly subjective, as was illustrated among the social geographers quoted in Extracts (5) and (6) above.

The linear regression model containing academic division instead of EPR estimates that the social sciences were significantly more negative (by around -0.4 ESI units, i.e. approximately four times the difference between narrow and wide EPRs.) than the arts/humanities, and the physical sciences were intermediate between these (see Table 5.10 above). This picture departs from these divisions' mean aggregate behaviour where their ESI scores are all negative (Figure 5.5). The regression summary table shows that the mean ESI score of the physical sciences does not differ significantly from the social sciences. When we look at the components of the ESI, we see that they do not operate in the same concerted manner that they did for the EPR (see Table 5.12 above). Modal adverbs/adjectives contribute significantly positively to ESI scores of social

sciences, while there is a non-significant negative contribution for arts/humanities. In other words, social sciences sound more epistemically confident with respect to their modal adverbs and adjectives. This trend is however oppositely directed for modal verbs, albeit non-significantly. These facts are hard to reconcile with the idea that modality *tout court* corresponds to epistemic commitment. Domain is the only ESI component that is significantly different from arts/humanities in the physical sciences, where it is positive, suggesting greater generality. Relativity behaves oppositely to expectations, being most negative in physical sciences (although not significantly so), and significantly more negative in the social sciences than in arts/humanities, indicating a trend to greater subjectivity as one moves from arts/humanities to social sciences to physical sciences.

The ESI components, then, pattern counter-intuitively in the divisions. The social sciences are characterized by stances that are more subjective (relativity–) and modally stronger (A–modality+), but also fuzzier (comparators–) and less intense (degree–). The arts/humanities meanwhile sound relatively objective, but also relatively intense (degree+). In short, ESI components within academic divisions pattern in a discordant manner, while, in contrast, they pattern concordantly within EPR subtypes. This suggests that EPR better reflects an epistemologically meaningful social division than does disciplinary affiliation, since it is able to capture stances that index tenable epistemic policies. In other words, disciplines are epistemologically heterogeneous, so it is difficult to materialize a discipline-typical epistemic stance: it would likely sound self-contradictory.¹¹⁵ On the other hand, the narrow/wide EPR distinction represents

¹¹⁵ This would violate the *de facto* norm of non-contradiction in academia: it is not an absolute metaphysical requirement that epistemic stances not contradict themselves.

tenable, albeit polarized, epistemic stances. Academic division, in amalgamating narrow and wide EPRs, produces an aggregate epistemic stance measure that indexes untenable epistemic policies (e.g. simultaneous weak degree and strong modality), or ones that seem to conflict with disciplinary epistemology (e.g. greater objectivity in the arts than in the social sciences). On the other hand, the narrow/wide division is tenable as a means of materializing epistemological difference with a single discipline as well as between different disciplines.

There was no main effect for topic, although it interacted with sex, and also separately with L1. Men and women diverged significantly in their ESI scores on generic topics (impact and teaching) and not on others (autobiography, subject and research). I suggested above that this was due to speakers drawing on socially broader sources of epistemic authority for these topics. I argued that academic disciplines are relatively egalitarian with respect to sex, so drawing on disciplinary consensus knowledge would not produce sex differentiation in ESI scores. Conversely, wider academia is more inequitable, and the differential power distribution is reflected in relatively more deferential language of women on the topics where they draw epistemic authority from that community. I illustrate this in Section 5.3.1 below in the case of one speaker across several topics.

The interaction of topic and L1, though significant, was less convincing (see Figure 5.12 above). Again, it was generic topics that displayed differentiation among speakers, with non-natives having higher ESI scores than natives, although this was of marginal significance. Non-natives also have significantly lower ESI scores on specific topics (research and subject) than on generic topics (impact and

research). This is suggestive of a difference in attention-paid-to-speech. In other words, it is possible that the politically charged and evaluative nature of the generic topics led to a reduction in attention paid to speech. In this case, the epistemic function of the ESI components could become less prominent than their rhetorical or emphatic use. Institutional affiliation was not a significant predictor of ESI score.

In the next section I illustrate topic-linked style shifting for one speaker, LAW.9.F, in order to show how epistemic policy shifts relate to variable use of ESI components.

5.3.1 An example of EPR/ESI shift by topic

The following four extracts illustrate style shifting by LAW.9.F, who had the largest shift in mean ESI of all participants, shifting by an average of -1 on the topic of impact. This is equivalent to using one weak modal verb more in every clause. I argue that this is in response to topic, and that LAW.9.F draws on different sources of epistemic authority depending the topic. For specific topics (research and subject), she appeals to intra-disciplinary consensus knowledge, and for generic topics (impact and teaching), she appeals to extra-disciplinary knowledge. I propose that these knowledge bases are gendered, i.e. that extra-disciplinary social organization instantiates a subordinate position for women, with associated “powerless” language. This relative powerlessness is materialized linguistically via more tentative epistemic stances, and correspondingly lower ESI

scores. In contrast, the intra-disciplinary knowledge base is relatively egalitarian with respect to gender, and does not reveal a corresponding drop in ESI score.

Extracts (15–18) have weaker ESI elements highlighted with italic type, while stronger elements are underlined. The ESI score for each clause is shown on the right. Recall that this is the sum of all positive and negative evidential language elements in that clause, so in some clauses this adds up to zero. Some clauses extend over several lines. The mean ESI score for each extract is shown at the bottom.

(15) Topic: subject	
but if you <i>maybe</i> look at it <u>more</u>	0
that it <i>could somehow</i> tie in to: moral philosophy	–2
then that's <i>sort of</i> been going on since Aristotle erm but	
<i>maybe</i> not	–2
the distinction <u>really</u> between what is morally good	+1
and what is legally good	0
wasn't <i>really</i> made <i>quite so much</i> erm	–2
so from the nineteenth century onwards there's been a <u>much</u>	
<u>more</u> of a <u>you know</u> divided divide between <i>sort of</i> positive	
law and law <u>strictly</u> so-called black letter law	+2
as opposed to <i>sort of</i> natural rights and erm moral questions	
of goodness	–1
which is still <u>generally seen</u> to be er <i>I suppose</i> the mainstream	0
but since nineteen forty-five <i>I suppose</i> after the after the	
second world war with the development of international	
human rights law there's been <u>more</u> of a revival of that <i>sort of</i>	
<i>way of</i> thinking in law	–2
so it depends which	0
what way you <i>sort of</i> interpret it	–1
whether it's <u>much more</u> of a <i>sort of</i> a <u>you know</u> morally good	
natural rights <i>type of</i> an argument	0
Mean	–0.54

Extract (15) features appeals to outside authority or self-evidence. 'If you look' suggests that the truth of the following proposition is objectively manifest, as does the reference to what is 'generally seen'. LAW.9.F also cites other scholars, albeit in a rather non-specific way, with 'since Aristotle...'.

(16) Topic: research	
I'm <u>more</u> interested in the jurisprudential <i>sort of</i> side of things than the theoretical aspects of it	0
because my work is er	0
I'm a specialist <u>really</u> in jurisprudence and legal theory?	+1
and that's where I'm coming from as a specialist in [legal theory?] ¹¹⁶	0
and linking that to [legal] application so	0
and I'm thinking of it in as a social justice erm topic and also as <u>you know</u> (law's <i>sort of</i> <u>real</u>) purpose	+1
what is law for	0
if it's not to try and make people's lives better	0
or if it's not to try and make people free	0
or to be able to live	0
the life they want to	0
so it's <u>very much</u> from that <i>sort of</i> perspective er	+1
which does have that <i>sort of</i> overarching philosophical basis <i>as far as I'm concerned</i>	-2
in the work that I do	0
er so it's not a comparative black letter <i>as I call it</i> black letter law	-1
looking at the statute	0
looking at case law	0
to see	0
'in France they do this	0
and in England they do this	0
isn't that interesting to see that'	0
it's <u>not at all</u> that	+1
it's <u>much more</u> erm well why	+2
and how has the court developed er these <i>particular</i> social psychological and philosophical concepts	-1
to mean this	0
and enshrined (them then) in law	0
and whether that's a good or a bad thing	0
how they've done	0
how they've interpreted it	0
so then it's <i>sort of like</i> saying	-2
'well <u>actually</u> (they've) interpreted it going down the wrong track	+1
or they've interpreted it going down the right track	0
er and why (I think) that	0
<i>Mean ESI</i>	+0.03

¹¹⁶ Square brackets contain modified material as the original may have identified the participant.

In Extract (16), LAW.9.F makes frequent appeals to her own epistemic authority. She introduces her research as what ‘I’m more interested in’ and ‘where I’m coming from’. The reason for her enquiry is located in her own interests, which provides ‘adequate causality’ in Linde’s (1993) terms: no further explanation is required. She describes her individual subjective perspective on her legal research object: ‘I’m thinking of it as’, ‘from that sort of perspective’, ‘as far as I’m concerned’. She also contrasts this with positions that she is not taking by using two quotatives, the first about a descriptive approach to law, and she says ‘it’s not that at all it’s much more...’ a normative/evaluative approach to law as illustrated in the second quotative.

(17) Topic: teaching

<i>I think</i> there <i>might</i> <u>actually</u> be: there’s a couple of <i>things</i>	–2
<i>I think</i> there <i>might</i> be a <u>very general</u> view of	0
they’ve got <u>lots</u> of knowledge about criminal. law or about law	+2
<u>in general</u>	
or about what justice is?	0
er and. because may <i>maybe some of them might</i> have done A	–3
level law	
they think	0
they know <u>quite a lot</u> about it already	+1
and then they’re <i>a bit</i> surprised when	–1
they they see <u>actually</u> it’s a <u>very</u> rigorous: discipline	+2
and you <u>really need</u> to have your sources	+2
you <u>need</u> to bolster <u>everything</u> with evidence	+2
you <u>can’t just</u> be this <i>sort of</i> broad <i>sort of</i> make these <u>broad</u>	+2
<u>sweeping</u> statements erm	
or you <i>can</i> do it	–1
but you’re <u>not going to</u> get <u>very</u> good marks erm	+2
and .erm. so <i>I think</i> it’s or so there’s that	–1
I also <i>think that</i> they don’t that they <i>maybe</i> <u>actually</u> <i>slight I</i>	–4
<i>don’t know</i> whether they are <i>slightly</i> disillusioned or not	
or change their minds throughout	0
in terms of <u>actually</u> what is justice	+1
or you <u>know</u> (we didn’t [inaudible]) <u>much more</u> sceptical	+3
the <u>more</u> they look into	+1
the way judges decide cases or whatever erm	0

and they <i>may</i> or they <i>may not</i> be <i>I suppose</i> it <u>just</u> depends on	-2
their interpretation of erm of the of the work	
that they then do	0
<i>I think maybe</i> the <u>most</u> difficult thing is	-1
for us to get beyond erm	0
them. <u>just</u> sort of examining the the paperwork in front of them	0
erm	
and <u>just</u> explaining what a case is saying	+1
or what 'judge <i>so and so</i> said this in <i>such and such</i> a case	-2
whereas judge <i>so and so</i> said this in <i>another</i> case'	-2
and so when when I'm giving them feedback on their essays	0
<i>it's like</i> 'but you've <u>got to</u> analyse it	0
you've <u>got to</u> say	+1
what <i>you think</i> is right or wrong about it'	-1
and they they <u>always</u> look shocked	+1
<i>it's like</i> "well what does my opinion matter or" erm..	-1
<i>Mean ESI</i>	0.00

In Extract (17), LAW.9.F draws heavily on her first-hand experience of teaching. She does not appeal to the expertise of other teachers or to wider academic consensus. She generalizes from her personal experience using illustrative quotatives, suggesting that her own experience is an adequate evidential basis for her claims.

(18) Topic: impact	
well <i>I suppose</i> with my work it <u>would</u> be: you <u>would</u> sort of I	0
<u>would</u> try and think	
that it <i>might</i> be applicable at a <i>sort of</i> an institutional level as	-3
well as <i>potentially</i> at case law level and judicial interpretation	
erm	
so if (I got) an article published	0
then: it <i>might</i> be cited in a court case	-1
but <i>probably I suppose</i> it <u>just</u> depends	-1
how thorough <i>some</i> of the barristers <i>may</i> be	-2
if they and if they think it supports their argument er <i>in some</i>	-1
<i>way</i>	
it <i>could</i> come up <i>quite</i> soon	-2
after it's published erm	0
<i>to my knowledge</i> that hasn't happened yet er yet hh	-1
but it <i>may</i> have	-1
I'm I'm <i>not very</i> good at researching finding these citations	-1

but I <u>need</u> to do that for the REF	+1
but erm also <i>I would like to think</i> that it has an impact at <i>sort of</i> institutional levels for the Council of Europe	-3
<i>for example</i> (now) last year I was approached by an MP from the co	-1
(who) sits on <i>one of</i> the committees at the Council of Europe	-1
and I: <u>you know</u> she said she	+1
when I met her	0
I said 'how did she hear about my work'	0
coz I don't know her	0
I don't know <u>anyone</u>	+1
who knows her	0
she's from [the Mediterranean]	0
and she said 'I read your article [...]'	0
so: she <u>must be just</u> reading <i>this sort of stuff</i>	0
or <i>maybe</i> she read the Human Rights Quarterly	-1
she <i>might</i> read human rights journals <i>or something</i>	-2
and erm or <i>perhaps</i> her researcher did	-1
and pointed it out	0
er and therefore she approached me er	0
to come and give an opinion erm at a committee on [...] in Europe	0
because they were commenting on another report	0
that had been done on [my research area as it applies] in Europe <u>generally</u>	+1
and [inaudible] so this committee was looking at	0
how it <i>might</i> impact on [European citizens] er	-1
so that's <u>obviously something</u> that <u>you know</u> is <i>quite</i> was an immediate within the net a year <i>or so</i> of <i>things</i> being published erm well <i>I suppose</i> a couple of years from the first <i>thing</i> being published er and erm.	-4
so so <i>I'm thinking</i> that <i>sort of like</i> Council of Europe or other European institutions although that hasn't happened yet	-3
although they <i>may</i> be reading it <i>I don't know</i> hhehh	-2
<i>Mean ESI</i>	-
	0.74

Extract (18) is characterized by appeals to outside sources of evidence about impact. LAW.9.F mentions barristers and MPs who can bestow impact on her research by reading it and applying it, depending on 'how thorough' they are or whether they or their researchers read that type of thing and will therefore notice her work. LAW.9.F does not talk about generating impact from her own initiative,

nor does she evaluate the whole enterprise negatively as in some earlier extracts. Since impact for LAW.9.F is generated the use of her research by those outside academia, she cannot determine based on her own epistemic resources what impact her work has had. Rather, barristers and MPs must do this, and with respect to them, LAW.9.F is therefore epistemically powerless. This contrasts with e.g. PHYS.34.M and CRIT.10.F in Extracts (8) and (9) above, who also defer to outside arbiters of impact, but with a rather more contemptuous attitude.

The four extracts from LAW.9.F are illustrative of shifting epistemic policy. From teaching to impact, and from research to subject, the speaker shifts from a personal evidence base of her own experience and expert perspective towards socio-political sources of evidence. In the case of impact, this evidence comes from barristers and MPs who decide from outside academia what counts as impact. In the case of research, evidence is drawn from what is self-evidently true, and by citing a scholarly consensus. The mean values for the ESI scores in these examples show a large negative shift as the speaker moves from intra-personal to extra-personal/political sources of evidence.

Chapter 6. Conclusion

Speakers' knowledge and beliefs underpin every aspect of their use of language. This means that epistemology has a foundational role in any model of situated language use. For this reason, I have argued that it is incumbent on sociolinguists and linguistic anthropologists to take an epistemologically principled approach to their research. This thesis provides the groundwork for an epistemological turn in sociolinguistics.

The present research characterizes epistemological difference by elaborating on the philosophical notion of epistemic policy. In addition to specifying further details of the structure of epistemic policy, particularly in terms of peoples' variable beliefs about the nature of knowledge, I have argued that epistemic policy should be conceived of as a linguistic construction. This means that epistemic policy shapes, and is shaped by different knowledge practices, since epistemic policy is materialized linguistically via the taking of epistemic stance. Through stance-taking, speakers position themselves relative to the propositional content of their utterances, relative to other subjects including their interlocutors, and relative to other social objects such as institutions. In so doing, they draw on the linguistic resources associated with a range of epistemic policies to construct a particular epistemic stance. Stance therefore indexes epistemic policy, and it also constitutes it by materializing it linguistically, and by reconfiguring it recombinantly in interaction.

In Section 6.1, I review the main empirical findings reported in Chapters 3, 4 and 5. This exploration of the relationship between language and epistemology was restricted to the case of academia, but the methods and

concepts apply equally well to individuals and communities beyond the academy. In Section 6.2, I illustrate the broader applicability of epistemic policy in the case of research on language and gender. In that section I also argue that social semiotic processes such as indexicality, enregisterment, and stance-taking—social meaning-making in general—are epistemologically nuanced in a way that has been underexplored in research so far. I suggest that the notions of epistemic policy range (EPR) and the epistemic stance index (ESI) are of importance to sociolinguistics, discourse analysis and research on English for Specific Purposes.

In Section 6.3 I argue that the ESI also amounts to a tool for a sociolinguistic turn in philosophy. So-called natural-language philosophy cannot rely merely on armchair intuitions about Standard English, and experimental philosophy cannot take its linguistic formulations for granted. Socialized philosophy already acknowledges these shortcomings, but has so far lacked a quantitative methodology. This thesis shows how variationist sociolinguistic methods can be used to quantify epistemological variation. Finally, I suggest some applications in the field of knowledge management, including knowledge transfer among epistemologically divergent groups.

6.1 Main empirical findings

In Chapter 3, I explored the distribution of three evidential variables in academic research articles. Modal verbs and adverbs were classed as strong or weak in the same way as in later chapters, and evidential verbs were classed as alethic (more objective) and epistemic (more subjective). I found that arts journals make greater

use of epistemic than alethic verbs, while this pattern is reversed for science journals. This was to be expected, given received stereotypes of the arts and sciences as respectively more subjective and more objective disciplines. What was not predictable from that received distinction between the Two Cultures was that this pattern of difference in the linguistic representation of epistemic stance would also be recapitulated within disciplines. In other words, the linguistic forms that indexed objective and subjective epistemic stances in the arts and sciences were also being used within single disciplines to index the same epistemological differentiation. A corpus of psychology articles manifested the same kind of difference in epistemic and alethic verbs as was present in arts and sciences writ large. This pattern of epistemological difference was so robust that it even recurred within a sub-disciplinary corpus of sociolinguistics articles. In short, the linguistic difference of the largest academic structure was repeated at the level of the discipline and also the sub-discipline.

A recursive distribution was not demonstrated for modal verbs and adverbs however. In the “Two Cultures” corpus of science and arts articles (the largest academic scale), it was found that the arts make more use of strong modal verbs than weak, while the sciences use more weak than strong. Modal adverbs followed the same pattern in the sciences, but were not differentiated within the arts. This was suggestive that sciences are more epistemically guarded than the arts, which is again remarkable given popular stereotypes of the bombastic, black-and-white scientist, and the woolly, muddled humanist.

So, there was robust evidence of linguistic recursivity for evidential verbs, with the sciences favouring alethic over epistemic verbs, combined with a less

robust pattern of favouring weak over strong modality. The opposite pattern of evidential verb use was demonstrated in the arts, and this too recurred robustly at smaller scales. These results make sense given that a more objective knowledge claim is more difficult to justify, and hence needs to be hedged more carefully. The recursive aspect makes sense given that the ideological basis of linguistic difference at the large scale is epistemological in character. At the smaller scales of the discipline and sub-discipline, it is also possible to adopt epistemologically divergent positions, and these correspond to linguistic differentiation which draws on the same linguistic resources as large-scale differentiation.

In Chapters 4 and 5, I looked at a wider selection of epistemic language in the speech of 34 academics in interviews in order to develop a more accountable measure of the linguistic construction of epistemological difference. In Chapter 3, I had counted positive tokens and compared their balance. While suggestive, this provided an incomplete picture. In Chapters 4 and 5, I included more linguistic variables implicated in the taking of epistemic stance, but importantly I delimited the stance envelope as the clausal environment of a proposition. The proposition is the thing that is modalized by a modal verb; it is what gets hedged or boosted; it is the thing about which one takes an epistemic stance. The clause is the minimal linguistic unit containing a proposition, and I operationalized it here to include modal and other evidential language including discourse markers that can carry epistemic information.

I developed a novel epistemic stance index (ESI) to quantify the combined effect of six types of epistemic language in each clausal token of my interview data. Parametric statistical tests were used to analyse the interview data, despite its

non-normal distribution, and it is necessary to be circumspect about interpreting those tests for that reason. There was no evidence of a relationship between internal factors and ESI, which suggested that epistemic stance is a social phenomenon. In other words, the linguistic construction of epistemic stance did not appear to be constrained by the grammatical features of the propositional content.¹¹⁷ In Chapter 5, I showed that ESI correlates with epistemic policy range (EPR). I argued that this means that epistemic stance is constrained by, and constrains, epistemological difference. In other words, epistemic policy affects the linguistic materialization of epistemic stance, but language-internal constraints do not.

So, while the investigative element of epistemic policy (I-policy) had been shown to correlate with differential use of alethic and epistemic verbs in Chapter 3, it was the variability in epistemic policy that was found to correlate with the broader suite of epistemic language examined in Chapter 5. In other words, the total range of epistemic policies to which one has access (wide versus narrow) is predictive of the language used to take stance, as measured by the ESI. A wide EPR correlates with a more positive ESI, while a narrow EPR correlates with a more negative ESI. Why should this be so? I suggest that having a wide range of epistemic policies at one's disposal makes one more likely to use the language of strong modality, greater generality, etc., because one is able to arrive at epistemic certainty through more policy routes. Furthermore, a wide EPR may make the use of epistemic language for rhetorical effect more likely. For example, using strong modality for emphasis, as opposed to using it in its strict epistemic meaning, to

¹¹⁷ It could have been the case that, e.g. propositions in the past tense generally associate with more confident-sounding ESI scores.

connote greater certainty, might be more likely for wide EPR speakers since the strict meaning is only “strict” relative to a narrow EPR. In short, a wider EPR makes more interpretations available, and may therefore lead to semantic bleaching.

Academic discipline did not capture variability in epistemic stance as effectively as EPR. This is remarkable given that disciplines are widely understood to reflect distinctive epistemic practices and policies that have been institutionalized. This lends further support to the use of epistemologically grounded measures of the linguistic construction of epistemic stance, rather than relying unquestioningly on the analytic utility of higher-level structures. In addition to more effectively elucidating linguistic variation, the EPR-ESI model is also detailed and perspicuous. It traces the epistemic belief through to its linguistic materialization in epistemic stance, and quantifies it in a way that remains straightforward to interpret, which is in contrast to some other top-down composite measures of discourse-level variation.

An interaction between topic and sex, and between topic and L1 was found in the linear regression model containing EPR. Both effects were concentrated in so-called generic topics (impact and teaching), while the ESI scores among the other topics were not significantly different. I illustrated the variability in ESI scores for one participant, and argued that this related to switching from one source of epistemic authority to another. In talking about teaching, the participant relied on her own experience and personal epistemic authority to justify her knowledge claims. When talking about impact, she switched to external sources of justification. This corresponded to a drop in ESI

scores, i.e. less confident language, and I argued that this is because of the relative powerlessness of this epistemic policy. In other words, in deferring to a source of justification out of one's control, one relinquishes epistemic authority, and this is reflected in less confident epistemic stances. I suggested that this effect is more exaggerated when deferring to external authority outside of one's discipline (or outside of the academy) than when deferring to external authority within one's discipline. To illustrate the latter case, a topic shift between talk about the participant's own research to talk about discipline consensus subject knowledge was shown to also associate with a drop in ESI, but this time a smaller one. While suggestive, this result was not quantitatively meaningful in the form presented; it would be an interesting area for further exploration in future work.

6.2 Implications for linguistics

I argued at length in Chapter 2 that beliefs have a crucial role in understanding how sociolinguistic variation takes place. How people conceive of their place in society, what they think about society, what social import a linguistic variable has—these sets of beliefs are what enable individuals to be sociolinguistic beings. If beliefs and language shape one other, then this suggests an empirical question: do people with different epistemological commitments behave differently linguistically? I have shown that the answer to this question is yes in the case of academia, and I hypothesize that this is generally the case. I advocate an epistemological turn in sociolinguistics to evaluate this hypothesis more widely.

This is important because epistemology has an explanatory and predictive role to play that has so far been underexplored.

Epistemology is the layer beneath sociolinguistic beliefs. This means that epistemological variation has the potential not only to lead to different sociolinguistic beliefs, but to produce qualitatively different semiotic processes. Indexicality is predicated on noticing difference and then attributing it to socially salient explanatory categories. It is clear that different epistemic policies (ways of seeing facts) will correspond to people attending to different differences, that is, they will notice different contrasts within the sociolinguistic field, and as a result they will see different indexical links from other people. Indexical fields (Eckert 2008) are therefore likely to vary from person to person in terms of their content and interrelationships.

A more fundamental possible implication of epistemological variation for indexicality is that the notion of difference may be different for some speakers. I will illustrate this via the case of mainstream feminism. Second wave feminists are defined in terms of seeking equal social status for men and women, i.e. reducing the disparity in social status between the sexes.¹¹⁸ Third wave feminists are skeptical of attempts to totalize identity categories, and criticise the reliance on reductive binaries. An example of this is sex, which is seen by second wavers as a binary biological variable. Third wavers problematize this by drawing attention to additional forms of biological sex, and also by advocating that greater attention be paid to gender, i.e. the social construct of sexual difference. They argue that the way that people conceive of their own gender is not fully determined by their

¹¹⁸ First wave feminism is a historically prior women's movement to gain political enfranchisement in terms of the right to vote and own property.

biological sex. The epistemological difference between second and third wave feminists may itself be (strategically) reduced to approximate a binary opposition between structuralists and post-structuralists respectively. In terms of this caricature, second wavers see difference as essential and foundational to human biology, but they want to challenge sexism by bringing about structural symmetry in society. Third wavers on the other hand see categoricity as oppressive, and their discourse focuses on nuanced and personal experiences of gender which resist totalization under the rubric of simple categories which it views as the instruments of hegemony, while at the same time being opposed to sexism.

Given this sweepingly general picture of feminism in late modernity, there appear to be some epistemological differences between second and third wave feminists. The former rely on objective categoricity to cut up social space, while the latter reject this conceptual move, preferring to proliferate subjectivities. Third wavers might be expected to have wider epistemic policy ranges than second wavers, and therefore to take epistemic stances with more positive ESI scores. In short, third wavers should sound more epistemically confident than second wavers. A further possible empirical implication is that post-structural feminists could be more inclined to reject binarity *tout court*, including at the semiotic level. If rejecting binarity politically could become internalized to the point where it pre-empts the “noticing” required to develop indexical links between linguistic variants and social categories, then post-structuralists might be expected to conceive of indexical fields in a rather sparser, or at least less fixed, manner. Is it possible to conceive of a post-structuralist semiotics that does not rely on

distinction? Is that even a thinkable system of meaning-making? Do we therefore need a more general model of social semiosis to describe that?

Another implication for sociolinguistics is in respect of how we look at variation other than sociophonetic variation. To study socially situated meaning-in-interaction—the use to which language is put—quantitatively, it seems perverse to restrict oneself to just phonetic variation. The traditional explanation for doing so is that all variants of a linguistic variable must have the same referential meaning. But this stipulation is not even tenable within structuralist linguistics, since the meaning of a word depends structurally on the meanings of others. This means that two people will never precisely coincide in their referential definition of a word because their linguistic systems will never completely coincide. So, if the initial sound in the word *through* is realised variably as [t] or [θ], it is not clear that these are variants of the same variable. In other words (th) in my *through* might be different from (th) in your *through*. Referential meaning is just as much subject to the effects of variable epistemological commitments as is social meaning, because all meaning is social (to an extent).

The application of the present work to sociophonetics is most obvious in re-evaluating the nature of the indexical field, which has been assumed to be a shared semiotic space. If epistemological variation is pervasive in wider society, then a shared orientation to an indexical field cannot be assumed; it must be considered as a variable. It is also possible that phonetic variants could acquire epistemological meaning, which may be linked to socioeconomic class, e.g. by association with stereotypical middle class teachers, or, by indexical linkage to

intelligence or wit, or with being “precise” or “sloppy”, such as, respectively, the released [t^h] variant of (t) or the [ɪŋ] variant of (ing).

Furthermore, prosody, information structure, and rate of speech are linguistic phenomena that also carry epistemic information, and have the potential to become epistemological indexes. Variable behaviour at these linguistic levels has been under-explored in sociolinguistics to date, and I suggest that epistemological considerations are of transparent and central importance to their role in the construction of stance.

Stance, then, is a multimodal phenomenon. Even the lexical and “modestly” morphosyntactic level that I’ve used in this thesis is partial. I have largely ignored prosody and other paralinguistic channels, let alone the physicality of stance, gesture (see e.g. Goodwin 2007), the kind of physical environments that we use in constructing stance, the interaction between buildings and the stances that they make possible. A large versus a small lecture theatre, different office arrangements will facilitate different stances. These wider contextual factors are no doubt important in the analysis of discourse variation, and they have been examined by various scholars. I suggest here too that these studies would be enhanced by attending to the epistemological assumptions upon which they base their models of situated language use.

Stance is a way of looking at the relationship between epistemology and language. The ESI is a principled measure of epistemic stance with a perspicuous interpretation. EPR is way of classifying speakers according to their epistemic commitments. An implication for research on English for specific purposes (ESP),

e.g. medical or legal English, or English for academic purposes (EAP) is that EPR is a better guide to evidential language use than is disciplinary affiliation.

One final possible implication for research on linguistics is in experimental linguistics. It would be interesting to see whether a model language with evidential suffixes of the type found in many of the world's languages would evolve differently under experimental conditions between participants with highly varied epistemic policies, e.g. Derridean scholars versus materials scientists, or Biblical literalists versus "New Atheists".

6.3 Other implications

I argued above for an epistemological turn in sociolinguistics. In this section I argue that this would have ramifications in disciplines that have undergone, or should undergo, a linguistic turn. These ramifications are more considerable in areas of study that have historically relied on a non-variationist conception of language, epistemology or both.

In the case of "natural language" philosophy, I argued in Chapter 1 that a reliance on Standard English in analytic philosophy has led to a distorted analysis of knowledge in epistemology. This is because the meaning of words like *know* and *knowledge* are routinely assumed to be self-evident, and philosophical analyses are built by deduction from this assumption. I argue that, rather, these words carry variable epistemic value depending on one's epistemic policy complement.

A wider epistemic policy range is associated with more positive ESI scores. I showed that this can be interpreted as a down-regulation of the epistemic meaning of epistemic stance elements, in favour of rhetorical meaning. In other words, strong modality does not mean strong epistemic commitment for a person with a wide EPR, rather it has more of an emphatic meaning. Likewise, the contrast between *know* and *think* or *believe* can be analysed as one of emphatic contrast. I suggest that this means that wide and narrow-EPR speakers will have different judgements about the meaning of these words. The formulation of questions in epistemology—*Does Charles know or only believe*—presupposes a theory of knowledge by suggesting that *knowing* is a more exacting standard than *merely believing*. It presupposes that everyone reading the question interprets *know* and *believe* in the same way, and that their judgements about whether Charles knows or not are based on their attitudes about justification. In fact, speakers are likely to differ on this interpretation of *know* and *believe*, and so part of their response will be informed by either a narrow or wide EPR. A wide-EPR speaker might attribute knowledge in a case where a narrow-EPR speaker does not, even though both agree about the nature of justification, for example. This is a severe challenge to the validity of many experimental philosophical survey questions.

The EPR-ESI model offers a way out of this. Just as it is an epistemologically grounded model for investigating sociolinguistic variation, it can be applied in reverse as a sociolinguistically grounded model for investigating epistemological variation. Rather than framing epistemological research in terms

of isolated “controlled” thought experiments, then, my research offers a way to approach epistemological variation through quantitative discourse analysis.

The EPR-ESI model also suggests a way to interrogate and synthesize Chomsky’s (e.g. 1986) notion of *knowledge of language* on the one hand with Labov *et al.*’s (2011) notion of the *sociolinguistic monitor* on the other. Is knowledge of language subject to the same kind of epistemological influences as propositional knowledge seems to be? Are there different ways of knowing a language? Is sociolinguistic knowledge the same kind of thing as knowledge of language, or is it more like propositional knowledge? What light does a variable conception of epistemology shed on the interface between these two systems of linguistic cognition?

There are implications of the present research for areas of inquiry beyond linguistics, but which use linguistically informed methods. In the field of social geography, our buildings and environment and the way we conceive of *place*, the way we get *place* from *space*, is contingent on the kinds of stances we can take up there.¹¹⁹ Buildings shape the way we talk, and the kinds of epistemic policies that persist into consensus. The EPR-ESI model thus has potential implication for new directions in research e.g. into the linguistic microclimate of institutions and the social epistemology of the built environment.

In the field of science and technology studies (STS), the present study offers a quantitative tool for research into the social construction of knowledge. STS has a rich tradition of detailed ethnographic studies of epistemic communities (e.g. Latour and Woolgar 1986). In the related field of knowledge management,

¹¹⁹ In social geography, *place* is the social construct relating to physical *space*, cf. gender/sex.

policies for the storage and dissemination of knowledge should take account of the linguistically constructed nature of epistemological difference. A message couched in the epistemic practices of one community may not be received in kind by, or may not be legible to, communities reliant on very different epistemic practices. This applies in education, the public communication of research, and in any communicative context characterized by epistemological difference or differential access to knowledge, such as expert-layperson interactions. The ESI offers a way to assess the amount of difference in the epistemic policies of two groups, and it offers information about how they differ. This can offer insights for reconciliation of conflicting interests by stakeholders in multidisciplinary fora that pervade organizational infrastructure.

6.4 Conclusion: Power and knowledge, facts and values, is's and oughts

(15)

I don't think so. er I think it. the discovery of Bucky balls nanotubes and and graphene sort of had to get into. O level even science simply because the older textbooks say there are two allotropes of carbon and now there's five hh so you've got to correct that two to five fairly quickly.

PHYS.34.M

In this extract, PHYS.34.M uses two strong semimodal verbs: *have to* and *got to*. These forms are often interpreted not epistemically, but deontically, i.e. in terms of obligations and rules rather than in terms of knowledge and logical necessity. I have argued that all epistemic policies, by which judgements about knowledge are

made, are largely matters of values, not facts. This means that they are ultimately positions about the way the world “ought to be”, not about the way it “is”. Epistemic authority is often presented as value-free, but it is not.

In the extract, what is the source of the obligation? Where does this necessity to correct textbooks come from? It is predicated on several beliefs. First, there are instrumental beliefs about what textbooks should be for. In particular, PHYS.34.M thinks that science text books should reflect the latest discoveries by scientists, and not contain false information presented as “facts”. A glance at an O level biology¹²⁰ textbook on the other hand will present a model of protein synthesis that omits the bulk of recent research on genes—including the fact that a gene is by no means a clearly-defined natural class of objects—in order to present material in an accessible way. Including 5 allotropes of carbon instead of 2 does not increase any student’s understanding about *why* allotropes can form in the first place, what they are for, or whether it is important to know about them. This points to an instrumental position about textbooks: What are they for? If it is to transmit facts in order to subsequently test the recall of facts, then it is far from clear where the “education” part comes into the picture. Rather, school subjects seem to be reduced to lists of words and numbers to be memorized. This seems to be a perverse motivation for updating textbooks as a matter of *necessity*, as PHYS24.M suggests. But perhaps this is a distortion of the situation. Perhaps he simply believes that the textbooks *have to* change because they are supposed to reflect reality dispassionately, i.e. to encode knowledge. We have seen that dispassionate epistemic policies are not possible. Even the cool scientific attitude

¹²⁰ O level is the former name for the GCSE public examinations in the UK that children take at the age of 16, when their compulsory education ends. Some exam boards still offer O levels too.

that textbooks should reflect reality implies that it is self-evident that there is one and only one reality to reflect. However, what is represented in the textbooks is a partial picture. Much that is important is left out, and much that is esoteric is included. Epistemic policies that presuppose realism about truth (i.e. that there is only one truth which corresponds to a universally-accessible reality) beg the question of *whose truth?* Why are children learning *these* facts and not *those* ones?

PHYS.24.M almost seems to see textbooks as being nomically connected to reality. When a discovery about reality is made, a chain of events is ineluctably set into motion that will result in the textbook being modified to reflect the newly revealed reality. This seems to correspond to what would classically be analysed as an alethic modal, i.e. that the force of the modal necessity derives from matters of truth about the world. It might also be more commonly analysed as an epistemic modal, i.e. that the force of the modal necessity derives from *what we know*. Perhaps the “most natural” reading is one of deontic modality, where the source of the obligation is arbitrary social rules. How one interprets modal flavour will depend on how one views the relationship between textbooks and scientific discoveries in light of all the points discussed above. In short, modal flavour is contingent on epistemic policy.

The values that imbue epistemic policy mean that diversity in epistemic policy constitutes ideological differentiation. Against this backdrop, differences in epistemic policy also associate with differences in epistemic stance. Iconization, erasure and recursion then operate on this field of sociolinguistic differentiation. The relationship between participants’ epistemic beliefs and their linguistic

expressions of those beliefs is embedded in value-laden ideologies that perpetuate difference semiotically. In other words, epistemic beliefs are linguistic constructs: they shape, and are shaped by, linguistic practice.

This means that the distinction between *is* and *ought*, between the epistemic and the deontic, depends on the epistemic commitments of the analyst. A particular modal token may be interpreted as a logical deduction or as a forceful instruction, but the relationship between epistemology, language and ideology suggests that this difference is far from clear-cut.

Appendix: List of articles used in the corpus analysis in Chapter 3

TWO CULTURES CORPUS

Nature

- Boddey, Justin A, Anthony N Hodder, Svenja Günther, Paul R Gilson, Heather Patsiouras, *et al.* 2010. “An aspartyl protease directs malaria effector proteins to the host cell,” *Nature*, 463: 627–31
- Initiative, The International Brachypodium. 2010. “Genome sequencing and analysis of the model grass *Brachypodium distachyon*,” *Nature*, 463: 763–68
- Li, Weikai, Sol Schulman, Rachel J Dutton, Dana Boyd, Jon Beckwith, *et al.* 2010. “Structure of a bacterial homologue of vitamin K epoxide reductase,” *Nature*, 463: 507–12
- Mayack, Shane R, Jennifer L Shadrach, Francis S Kim, and Amy J Wagers. 2010. “Systemic signals regulate ageing and rejuvenation of blood stem cell niches,” *Nature*, 463: 495–500
- Melton, Collin, Robert L Judson, and Robert Blelloch. 2010. “Opposing microRNA families regulate self-renewal in mouse embryonic stem cells,” *Nature*, 463: 621–26
- Rasmussen, Morten, Yingrui Li, Stinus Lindgreen, Jakob Skou Pedersen, Anders Albrechtsen, *et al.* 2010. “Ancient human genome sequence of an extinct Palaeo-Eskimo,” *Nature*, 463: 757–62
- Russo, Ilaria, Shalon Babbitt, Vasant Muralidharan, Tamira Butler, Anna Oksman, *et al.* 2010. “Plasmepsin V licenses *Plasmodium* proteins for export into the host erythrocyte,” *Nature*, 463 (Nature Publishing Group): 632–36
- Smith, Stuart B, Hui-Qi Qu, Nadine Taleb, Nina Y Kishimoto, David W Scheel, *et al.* 2010. “Rfx6 directs islet formation and insulin production in mice and humans,” *Nature*, 463: 775–80
- Tan, Kelly R, Matthew Brown, Gwenaél Labouèbe, Cédric Yvon, Cyril Creton, *et al.* 2010. “Neural bases for addictive properties of benzodiazepines,” *Nature*, 463: 769–74
- Zhang, Jianming, Francisco J Adrián, Wolfgang Jahnke, Sandra W Cowan-Jacob, Allen G Li, *et al.* 2010. “Targeting Bcr-Abl by combining allosteric with ATP-binding-site inhibitors,” *Nature*, 463: 501–6

Science

- Bai, Fan, Richard W Branch, Dan V Nicolau, Teuta Pilizota, Bradley C Steel, *et al.* 2010. "Conformational spread as a mechanism for cooperativity in the bacterial flagellar switch," *Science*, 327: 685–89
- Van Bocxlaer, Ines, Simon P Loader, Kim Roelants, S D Biju, Michele Menegon, *et al.* 2010. "Gradual adaptation toward a range-expansion phenotype Initiated the global radiation of toads," *Science*, 327: 679–82
- Chapman, Jason W., Rebecca L. Nesbit, Laura E. Burgin, Don R. Reynolds, Alan D. Smith, *et al.* 2010. "Flight orientation behaviors promote optimal migration trajectories in high-flying insects," *Science*, 327: 682–85
- Ehre, David, Etay Lavert, Meir Lahav, and Igor Lubomirsky. 2010. "Water freezes differently on positively and negatively charged surfaces of pyroelectric materials," *Science*, 327: 672–75
- Ge, Peng, Jun Tsao, Stan Schein, Todd J Green, Ming Luo, *et al.* 2010. "Cryo-EM model of the bullet-shaped vesicular stomatitis virus," *Science*, 327: 689–93
- Ide, Satoru, Takaaki Miyazaki, Hisaji Maki, and Takehiko Kobayashi. 2010. "Abundance of ribosomal RNA gene copies maintains genome integrity," *Science*, 327: 693–96
- Pellizzoni, a, A Trois, M Tavani, M Pilia, A Giuliani, *et al.* 2010. "Detection of gamma-ray emission from the Vela pulsar wind nebula with AGILE," *Science*, 327: 663–65
- Petta, J R, H Lu, and a C Gossard. 2010. "A coherent beam splitter for electronic spin states," *Science*, 327: 669–72
- Richardella, Anthony, Pedram Roushan, Shawn Mack, Brian Zhou, David a Huse, *et al.* 2010. "Visualizing critical correlations near the metal-insulator transition in Ga(1-x)Mn(x)As," *Science*, 327: 665–69
- Shi, Dalin, Yan Xu, Brian M Hopkinson, and François M M Morel. 2010. "Effect of ocean acidification on iron availability to marine phytoplankton," *Science*, 327: 676–79
- Smith, Robert J, Justin T Okano, James S Kahn, Erin N Bodine, and Sally Blower. 2010. "Evolutionary dynamics of complex networks of HIV drug-resistant strains: The case of San Francisco," *Science*, 327: 697–701
- Stiess, Michael, Nicola Maghelli, Lukas C Kapitein, Susana Gomis-Rüth, Michaela Wilsch-Bräuninger, *et al.* 2010. "Axon extension occurs independently of centrosomal microtubule nucleation," *Science*, 327: 704–7
- Yovel, Yossi, Ben Falk, Cynthia F Moss, and Nachum Ulanovsky. 2010. "Optimal localization by pointing off axis," *Science*, 327: 701–4

Tamara Journal for Critical Organization Inquiry

- Alcadipani, Rafael, and Damian Hodgson. 2009. "By Any Means Necessary ? Ethnographic Access , Ethics and the Critical Researcher," *Tamara Journal for Critical Organization Inquiry*, 7: 127–47
- Alves, FM Pereira. 2010. "A Eulogy, a Foil, and a Rebuke: To Whom, in Which Order, and Why?," *Tamara Journal for Critical Organization Inquiry*, 7: 192–99
- Delattre, Miguel, Rodolphe Ocler, Pascal Moulette, and Karine Rymeyko. 2009. "Singularity of qualitative research: From collecting information to producing results," *Tamara Journal for Critical Organization Inquiry*, 7: 33–51
- Gold, AH Aaron H. 2009. "Immutable ethics: A non-theistic treatise in defense of the universality and unchangeability of Right and Wrong," *Tamara Journal for Critical Organization Inquiry*, 7: 177–92
- Höpfl, Heather. 2009. "Reflections from a blind eye," *Tamara Journal for Critical Organization Inquiry*, 7: 98–105
- Keso, Heidi, Hanna Lehtimäki, and Tarja Pietiläinen. 2009. "Engaging in reflexive acts: Sharing experiences on reflexivity in empirical qualitative research," *Tamara Journal for Critical Organization Inquiry*, 7: 51–71
- Knutsen, Bjørn Olav, and Elisabeth Pettersen. 2009. "The Arts of Michael Moore and American soft power," *Tamara Journal for Critical Organization Inquiry*, 7: 107–27
- Phillips, N, and S Clegg. 2009. "Reflexivity in research: The role of the researcher, the research process, and the nature of facts in the study of organizations," *Tamara Journal for Critical Organization Inquiry*, 7: 6–9
- Rehn, Alf. 2009. "The false coin of reflection? Contributions, reflections and the economic logics of academia," *Tamara Journal for Critical Organization Inquiry*, 7: 88–98
- Sandström, Johan. 2009. "Global trafficking networks and business studies," *Tamara Journal for Critical Organization Inquiry*, 7: 147–60
- Schipper, Frits. 2009. "Excess of rationality?; About rationality, emotion and creativity. A contribution to the philosophy of management and organization," *Tamara Journal for Critical Organization Inquiry*, 7: 161–77
- Tapani, Annukka. 2009. "'Is becoming a researcher some kind of role-playing': Roles of the researcher in the process of forming the identity," *Tamara Journal for Critical Organization Inquiry*, 7: 71–88
- Tsekeris, Charalambos, and Nicos Katrivesis. 2009. "Ethical reflexivity and epistemological weakness," *Tamara Journal for Critical Organization Inquiry*, 7: 26–33

New Left Review

- Balakrishnan, Gopal. 2009. "Speculations on the stationary state," *New Left Review*, 59: 5–26
- Breman, Jan. 2009. "Myth of the global safety net," *New Left Review*, 59: 29–36
- Hall, Stuart. 2010. "Life and times of the first New Left," *New Left Review*, 61: 177–96
- Ho-Fung, Hung. 2009. "America's head servant? The PRC's dilemma in global crisis," *New Left Review*, 60: 5–25
- Jameson, Frederic. 2009. "Marx and montage," *New Left Review*, 58: 109–17
- Kalka, Joachim. 2009. "Money as we knew it?," *New Left Review*, 60: 65–76
- Pomeranz, Kenneth. 2009. "The Great Himalayan watershed: Agrarian crisis, mega-dams and the environment," *New Left Review*, 58: 5–39
- Reifer, Tom. 2009. "Capital's cartographer," *New Left Review*, 60: 119–30
- Reynolds, Teri. 2010. "Dispatches from the emergency room," *New Left Review*, 61: 49–57

SOCIOLINGUISTIC CORPUS

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